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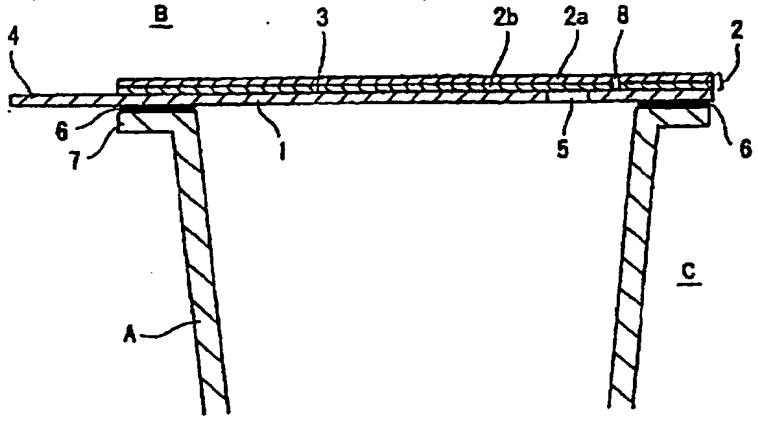
(54) PACKAGING MATERIAL AND CONTAINER FOR SEALING BEVERAGE AND FOOD

(57) A packaging material and a container as a packaging means for beverage and food heated for intake by a microwave oven which can provide the least risk of bumping or boilover during heating without taking measures such as unpacking them or making holes in them before heating, wherein the covers of the packaging material and container comprises a nonpermeable material basic body having a gas discharge hole and a nonpermeable cover body which covers the gas discharge hole and is stuck on one surface of the basic body, and the cover body or a part of the cover body is stuck to the basic body at such a sticking strength that it is peeled off when a pressure of excess gas produced from a packaged food and beverage acts on the cover body through the gas discharge hole.

Fig. 9



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Description

Technical Field

[0001] The present invention relates to a packing material, which is used as a lid for sealing off a container which is filled with beverage such as coffee and tea, liquid-state food such as soup and miso soup, cooked rice, food containing a large amount of moisture such as curry, frozen food which becomes liquid-state food or food containing a large amount of moisture when heated, and the like (These will be hereinafter referred to collectively as "beverage and/or food.") or used as a package which is shaped as a bag, a tube or the like for packing beverage and/or food (Packages shaped as a bag, a tube or the like will be hereinafter referred to collectively as "packing bags."), and to a container for sealing beverage and/or food. More precisely, the present invention relates to a packing material and a beverage/food sealing container which allow, when it is necessary to heat up beverage and/or food filled in a container or packing bag prior to eating or drinking, to microwave the sealed container or packing bag without opening a lid which seals off the container or opening the packing bag.

Background Art

[0002] These days, a wide variety of beverage and/or food to be microwaved or otherwise heated are sold in the market. A consumer who purchased such beverage and/or food, before heating a container or packing bag in which beverage and/or food is sealed up, opens a lid of the container or opens the packing bag and pours the beverage and/or food into other container, partially or entirely removes the lid of the container or partially or entirely opens the packing bag. This is because if the container or packing bag is microwaved as it is, vaporization of liquid inside the container or packing bag increases the pressure and causes the container or packing bag to blow up, whereby a microwave oven becomes dirty inside or even a risk of injury, including a burnt, is created.

[0003] While opening a hole in the lid of the container or locally in the packing bag before heating up to thereby allow air, vapor or the like inside the container to escape can prevent blowout of the container or packing bag, this demands a tool for and a trouble of opening the hole. In addition, when the container or packing bag is opened a hole and heated up in a store where the purchase is made, the beverage and/or food leaks out through the opened hole, which is inconvenient for transportation.

[0004] Among the proposals to overcome the inconvenience includes a container having a structure that a lid for sealing off the container is a multi-layer lid, an upper layer of the lid can be peeled off and a degassing hole is formed in a lower layer (Japanese Utility Model Gazette Nos. H6-24381 and H7-52058 and Japanese Patent Gazette No. S62-12099; hereinafter referred to as "conventional technique 1"). In the meantime, a packing material obtained by laminating or otherwise appropriately joining a breathable film or a paper and a synthesized resin film having an opening portion to each other is known (Japanese Patent Publication No. S63-63353 and Japanese Utility Model Publication No. S63-59867; hereinafter referred to as "conventional technique 2").

[0005] However, according to the conventional technique 1, since a gas discharging hole is formed as the upper layer of the lid is peeled off, the technique, although not requiring a tool for opening the hole, causes the pressure inside the container to increase if the container is heated without peeling off the upper layer of the lid and may permit the container to blow out. Further, after the upper layer of the lid is peeled off, since there is the opening in the lid, it is difficult to transport the container.

[0006] On the other hand, according to the conventional technique 2, although heating up of a package does not allow the pressure inside the package to increase since the packing material is breathable, the breathability of the packing material may permit contamination from outside, which is a problem in quality.

Disclosure of Invention

[0007] An object of the present invention is to provide for a packing material for sealing beverage and/or food, with which it is possible to heat up the beverage and/or food using a microwave oven without preliminarily treating a packing bag of the packing material in which the beverage and/or food is sealed up.

[0008] Other object of the present invention is to provide for a container for sealing beverage and/or food, with which it is possible to heat up the beverage and/or food using a microwave oven without preliminarily treating the container in which the beverage and/or food is sealed up.

[0009] A first invention of the present application is a packing material comprising: an unbreathable base containing a gas discharging hole; and an unbreathable cover which is adhered to one surface of the base so as to cover the gas discharging hole, wherein the cover is adhered to the base at such an adhesion strength which permits the cover to be peeled off when the pressure of excessive gas, which is generated from the beverage and/or food which is wrapped in the packing material, acts upon the cover through the gas discharging hole.

[0010] With respect to the packing material according to the first invention, a preferred aspect is that the adhesion strength between the base and the cover is 100 - 1,650gf/15mm.

[0011] In the packing material according to the first invention and/or the preferred aspect above, the cover comprises a second gas discharging hole, and the second gas discharging hole is formed at a position not overlapping the gas discharging hole of the base.

[0012] A second invention of the present application is a packing material comprising: an unbreathable base containing a gas discharging hole; and an unbreathable cover which is adhered to one surface of the base so as to cover the gas discharging hole, wherein a portion of the cover is adhered to the base at such an adhesion strength which permits the cover to be peeled off when the pressure of excessive gas, which is generated from the beverage and/or food which is wrapped in the packing material, acts upon the cover through the gas discharging hole, and a peeled portion of the cover forms a gas discharging path which links the gas discharging hole with outside the packing material.

[0013] With respect to the packing material according to the second invention, a preferred aspect is that the gas discharging path is formed as the base and the cover are adhered to each other at an adhesion strength of 50 - 800gf/15mm.

[0014] With respect to the packing material according to the second invention and/or the preceding preferred aspect, preferably, the gas discharging path is formed as the base and the cover are adhered to each other at an adhesion strength which is 5 - 80 % of an adhesion strength other than at the gas discharging path.

[0015] With respect to the packing material according to the second invention and/or the preceding preferred aspect, preferably, the cover comprises a second gas discharging hole at a position not overlapping the gas discharging hole of the base, and the gas discharging path is formed between the gas discharging hole and the second gas discharging hole.

[0016] A third invention of the present application is a container for sealing beverage and/or food, comprising: a container main part which transmits a microwave; and a lid which seals off the container main part, wherein the lid comprises an unbreathable base containing a gas discharging hole and an unbreathable cover which is adhered to a top surface of the base so as to cover the gas discharging hole, and the cover is adhered to the base at such an adhesion strength which permits the cover to be peeled off when the pressure of excessive gas, which is generated from the beverage and/or food which is wrapped in the packing material, acts upon the cover through the gas discharging hole.

[0017] With respect to the container according to the third invention, a preferred aspect is that the adhesion strength between the base and the cover is 100 - 1,650gf/15mm.

[0018] With respect to the container according to the third invention and/or the preceding preferred aspect, preferably, the cover comprises a second gas discharging hole, and the second gas discharging hole is formed at a position not overlapping the gas discharging hole of the base.

[0019] With respect to the container according to the third invention and/or the preceding preferred aspect, preferably, the lid comprises a tongue-like protrusion, and the tongue-like protrusion is formed by extending the base.

[0020] With respect to the preceding preferred aspect, the second gas discharging hole is preferably formed at a position opposite to the tongue-like protrusion.

[0021] With respect to the container according to the third invention and/or the preceding preferred aspect, the gas discharging hole of the base preferably comprises a reclosing prevention piece at a peripheral edge of the hole, and the base preferably comprises one or more than one reclosing prevention cuts other than at the gas discharging hole.

[0022] With respect to the container according to the third invention and/or the preceding preferred aspect, preferably, the container main part comprises a microwave shielding layer in a side surface portion, and the microwave shielding layer is disposed so as to cover a portion in which a top surface of the sealed beverage and/or food contacts the container main part.

[0023] A fourth invention of the present application is a container for sealing beverage and/or food, comprising: a container main part which transmits a microwave; and a lid which seals off the container main part, wherein the lid comprises an unbreathable base containing a gas discharging hole and an unbreathable cover which is adhered to a top surface of the base so as to cover the gas discharging hole, a portion of the cover is adhered to the base at such an adhesion strength which permits the cover to be peeled off when the pressure of excessive gas, which is generated from the beverage and/or food which is wrapped in the packing material, acts upon the cover through the gas discharging hole, and a peeled portion of the cover forms a gas discharging path which links the gas discharging hole with outside the lid.

[0024] With respect to the container according to the fourth invention, a preferred aspect is that the gas discharging path is formed from the gas discharging hole to a brim of the lid.

[0025] With respect to the container according to the fourth invention and/or the preceding preferred aspect, preferably, the cover comprises a second gas discharging hole at a position not overlapping the gas discharging hole of the base, and the gas discharging path is formed between the gas discharging hole and the second gas discharging hole.

[0026] With respect to the container according to the fourth invention and/or the preceding preferred aspect, preferably, the gas discharging path is formed as the base and the cover are adhered to each other at an adhesion strength of 50 - 800gf/15mm.

[0027] With respect to the container according to the fourth invention and/or the preceding preferred aspect, preferably, the gas discharging path is formed as the base and the cover are adhered to each other at an adhesion strength which is 5 - 80 % of an adhesion strength other than at the gas discharging path.

[0028] With respect to the container according to the fourth invention and/or the preceding preferred aspect,

preferably, the lid comprises a tongue-like protrusion, and the tongue-like protrusion is formed by extending the base.

[0029] With respect to the preceding preferred aspect, the tongue-like protrusion is preferably formed at a position opposite to a rear end of the gas discharging path.

[0030] With respect to the container according to the fourth invention and/or the preceding preferred aspect, preferably, the gas discharging hole of the base comprises a reclosing prevention piece at a peripheral edge of the hole, and the base comprises one or more than one reclosing prevention cuts other than at the gas discharging hole.

[0031] With respect to the container according to the fourth invention and/or the preceding preferred aspect, preferably, the container main part comprises a microwave shielding layer in a side surface portion, and the microwave shielding layer is disposed so as to cover a portion in which a top surface of the sealed beverage and/or food contacts the container main part

[0032] In each invention of the present application, the "adhesive strength" is a value which is measured by the following method. For instance, using a tension test machine equipped with two chucks (e.g., STROGRAPH-W or the like available from Toyo Seiki), two test specimens adhered to each other are peeled off a little at edge portions, the peeled edge portions are firmly held respectively by the two chucks, and the two holding chucks are moved apart from each other at a speed of 20 mm/min while measuring a load, to use the load as an adhesion strength. Further, adhesion strength values were converted, on the same basis that the width of the test specimens was 15 mm, into the unit of "gf/15mm."

Brief Description of Drawings

[0033] Figs. 1 and 2 are a front surface view and a back surface view, respectively, of a lid of a container, which is an embodiment of the packing material according to the first invention. Figs. 3 and 4 are an X-X' cross sectional view and Y-Y' cross sectional view, respectively, of Fig. 1. Fig. 5 is a cross sectional view of the container which is sealed with the lid. Denoted at A is a main body of the container, denoted at B is the lid, denoted at C is the container, denoted at 1 is a base, denoted at 2 is a cover, denoted at 3 and 6 are adhesive agents, denoted at 4 is a tongue-like protrusion, denoted at 5 is are gas discharging holes, and denoted at 7 is a flange.

[0034] Fig. 6 is an appearance view showing an embodiment of the packing material according to the first invention. Fig. 7 is a partially enlarged cross sectional view along a Z-Z' line in Fig. 6. Denoted at D is a packing bag, denoted at 10 and 11 are horizontal seal portions, and denoted at 12 is a vertical seal portion.

[0035] Fig. 8 is a perspective appearance view showing an embodiment of the container according to the third invention. Fig. 9 is a partially enlarged cross sectional view along a V-V' line in Fig. 8. Denoted at 8 is a second gas discharging hole. Fig. 10 is a perspective appearance view showing a function of a tongue-like protrusion in the container shown in Fig. 8, wherein denoted at E is an over cap.

[0036] Fig. 11 is an appearance view of a packing bag, which is another embodiment of the packing material according to the first invention. Fig. 12 is a partially enlarged cross sectional view along a W-W' line in Fig. 11. Denoted at F is the packing bag.

[0037] Figs. 13 and 14 are a front surface view and a back surface view, respectively, of a lid of a container, which is an embodiment of the packing material according to the second invention. Figs. 15 and 16 are partially enlarged cross sectional views along an X-X' line and Y-Y' line, respectively, in Fig. 13. Fig. 17 is a partial cross sectional view of the container which is sealed with the lid. Denoted at 9 are gas discharging paths.

[0038] Fig. 18 is an appearance view another embodiment of the packing material according to the second invention. Fig. 19 is a partially enlarged cross sectional view along a Z-Z' line in Fig. 18.

[0039] Fig. 20 is a perspective appearance view showing an embodiment of the container according to the fourth invention. Fig. 21 is a partially enlarged cross sectional view along a V-V line in Fig. 20.

[0040] Fig. 22 is an appearance view of a packing bag, which is another embodiment of the packing material according to the second invention.

[0041] Figs. 23 and 24 are back surface views of lids which are used for the container according to the fourth invention. Denoted at 13 is a reclosing prevention piece.

[0042] Fig. 25 is a back surface view showing another aspect of a lid which is used for the container according to the fourth invention. Denoted at 14 are reclosing prevention cuts.

[0043] Fig. 26 is a perspective appearance view showing still other embodiment of a lid which is used for the container according to the fourth invention. Fig. 27 is a partially enlarged cross sectional view along a U-U' line in Fig. 26. Denoted at 15 is a step, denoted at 16 is an aluminum foil layer, denoted at 17 is a heat insulation layer, and denoted at 18 is a coating layer.

Best Mode for Carrying Out the Invention

[0044] A packing material according to the first invention comprises a base and a cover, and if the packing material is to be used to seal beverage and/or food which is to be heated up with a microwave oven, the packing material is formed by a non-metallic unbreathable material. Examples of such a material include plastic materials of an olefin resin, such as polyester, nylon, polypropylene, polyethylene and polystyrene, a laminated material of these plastic materials, a paper, and a laminated material of a paper and a plastic material. Meanwhile, where the packing material is not to be used

to seal off beverage and/or food which is to be heated up with a microwave oven, other than the materials described above, a metallic material such as an aluminum foil may be used.

[0045] The base of the packing material according to the first invention has a thickness of 4 - 300μm, and preferably, 50 - 100μm. Since the base is adhered to itself or a flange portion or the like of a container at a large strength and subjected to relatively large force when peeled off, it is proper that the thickness is as described above for the purpose of preventing destruction of the base during peeling off.

[0046] The base comprises a gas discharging hole for ejecting excessive gas from inside a container or packing bag which is formed using this packing material. A shape of hole and how many such holes are to be formed may be appropriately determined in accordance with the volume of the container or packing bag, the amount of beverage and/or food to be filled in, a water content, etc. That is, the gas discharging hole only has to attain the objective to discharge excessive gas from inside the container or packing bag, and therefore, the shape of the gas discharging hole may be any form, such as an elliptical shape, a polygonal shape and a letter-like shape, in addition to a circular shape as that according to the embodiment With respect to the size of the gas discharging hole as well, the size may be any size to the extent that it is possible to attain the objective. This applies similarly to the number of the gas discharging holes.

[0047] The cover of the packing material according to the first invention has a thickness of 4 - 500μm, and preferably, 10 - 300μm approximately, such that the cover easily falls off from the base as the pressure inside the container or packing bag increases. Covering the gas discharging hole, the cover is adhered to the base with an adhesive agent. An adhesion strength between the base and the cover is approximately 100 - 1,650gf/15mm, and preferably, 150 - 1,250gf/15mm approximately at an ordinary temperature. Adhesion becomes insufficient and therefore may damage sealing if the adhesion strength is smaller than 100gf/ 15mm at an ordinary temperature. If the adhesion strength is more than 165gf/15mm, an increase in the pressure inside the container or packing bag prevents the cover from separating from the base, which may damage the container or packing bag. Thus, neither is desirable.

[0048] Examples of the adhesive agent include polypropylene, polyethylene, an ethylene-acrylic acid resin, an ethylene-vinyl acetate resin, a polyurethane resin, an acrylic resin, wax, etc. An adhesive layer of the adhesive agent as such has a thickness of approximately 1 - 50μm, and preferably, approximately 2 - 30μm.

[0049] The packing material according to the first invention is formed in the shape of a lid for a container, a bag, a tube or the like, and used for packaging beverage and/or food. For use as a lid of a container, the packing material is formed in approximately the same shape as an outer shape of a flange portion of a container, for example, and after filling beverage and/or food in the container, attached to the flange portion of the container. Attaching to the container may be bonding using an adhesive agent or the like at a relatively large strength. When the packing material is to be used as a packing bag, one sheet of the packing material having an appropriate size is bent and the base is relatively strongly adhered to itself on two sides, and after filling in beverage and/or food on one side which is open, the base is relatively strongly adhered to itself at the opening, for instance. When two sheets of the packing material are to be used, the bases are adhered to each other on three sides, and after filling in beverage and/or food on one side which is open, the bases at the opening are adhered to each other with an adhesive agent at a relatively large strength. Alternatively, after placing beverage and/or food within a hard container, the container may be sealed off with the packing material.

[0050] For heat sterilization of beverage and/or food which is filled within such a container or packing bag as above, the beverage and/or food is sterilized in advance, filled in a sterile state within the container or packing bag, and sealed up in the container or packing bag. If sterilization other than heat sterilization is to be used, after filling the beverage and/or food within the container or packing bag and sealing off the container or packing bag, the sealed container or packing bag may be sterilized as it is with the beverage and/or food contained inside.

[0051] Base-to-base adhesion or adhesion of the base and other item (e.g., a container) can be achieved with a resin, such as polypropylene, polyethylene, polystyrene, an ethylene-acrylic acid resin and an ethylene-vinyl acetate resin, or an adhesive agent. An adhesion strength is strong in proportion to the adhesion strength between the base and the cover of the packing material. For example, the adhesion strength is 300gf/15mm or larger, and preferably, 800 - 1,500gf/15mm approximately, at an ordinary temperature. This is because sealing may be damaged if the adhesion strength is smaller than 300gf/15mm at an ordinary temperature. The adhesion strength between the base and the cover of the packing material according to the first invention is desirably adjusted to be approximately 2/3 or smaller of the strength of base-to-base adhesion or adhesion of the base and other item.

[0052] When beverage and/or food contained within a container or packing bag formed using the packing material according to the first invention is heated up with a microwave oven, as the pressure inside the container or packing bag increases due to heating, the pressure of the base acts upon the relatively weak adhesive layer between the base and the cover through the gas discharging hole which is formed in the base, the cover falls off from the base because of the pressure, and excessive gas is discharged externally to the container or packing bag. Hence, it is possible heat up the beverage

and/or food as it is without opening the container or packing bag or forming a hole in the container or packing bag.

[0053] Further, since the packing material according to the first invention is formed by the unbreathable base and the unbreathable cover, it is possible to hygienically preserve beverage and/or food which is sealed in a container whose lid is this packing material or a packing bag formed by this packing material. Moreover, even when heated up in a microwave oven, such a container or packing bag does not blow out, consequently make the microwave oven dirty inside, or hence bear a risk of causing boilover of heated beverage and/or food and thereby burning or otherwise injuring people. When microwaved in a store of purchase as well, such a container or packing bag can be easily brought outside the store. In addition, since such a container or packing bag is sealed off with the cover, excessive vaporization, sudden boiling or the like of moisture associated with heating can be effectively prevented.

[0054] When a container or packing bag using the packing material according to the first invention is to preserve beverage and/or food which emits gas during preservation (such as fermented vegetables), since excessive gas created inside the container or packing bag escapes through the gas discharging hole of the base of the packing material, the package does not break to thereby enable safe preservation.

[0055] In a preferred aspect of the packing material according to the first invention, there is a second gas discharging hole in the cover at a position not overlapping the gas discharging hole of the base.

[0056] The second gas discharging hole does not have to be always wide open, but may be merely a small cut in the cover, for instance. At least, the second gas discharging hole has to open when gas, vapor or the like escapes at the gas discharging hole which is formed in the base. In short, as beverage and/or food packaged in a container or packing bag using the packing material according to the first invention is heated up in a microwave oven, excessive gas generated due to heating pressurizes the cover through the gas discharging hole of the base, and the cover consequently separates from the base. At this stage, if there is not the second gas discharging hole, the gas can not escape outside the container or packing bag unless cover is peeled off at the gas discharging hole of the base to an edge of the packing material. If there is the second gas discharging hole opened in the cover, only if peeling off of the cover occurs over a narrow space between the gas discharging hole of the base and the second gas discharging hole, it is possible to link inside the container or packing bag with outside the container or packing bag. Considering such a function of the second gas discharging hole, it is further desirable that the second gas discharging hole is located appropriately close to the gas discharging hole of the base.

[0057] Being only required to attain the objective of discharging excessive gas from a container or packing bag, the second gas discharging hole may be formed in any shape other than the cut-like shape according to the embodiment, such as a circular shape, an elliptic shape, a polygonal shape and a letter-like shape. With respect to the size of the hole as well, the size may be any size to the extent that it is possible to attain the objective. This applies similarly to the number of the holes.

[0058] A packing material according to the second invention is similar in basic structure to the packing material according to the first invention. Further, the materials and the thicknesses of the base and the cover and the type of the adhesive agent which is used to adhere the two to each other may be the same as those for the packing material according to the first invention.

[0059] The packing material according to the second invention is characterized in that a gas discharging path is formed in the packing material according to the first invention. The gas discharging path is formed by reducing an adhesion strength between the base and the cover than an adhesion strength in other portion, at a position which links the gas discharging hole with outside the packing material.

[0060] The gas discharging path is formed such that a portion of the cover falls off from the base due to the pressure of excessive gas which is discharged through the gas discharging hole of the base, and the thickness of the adhesive layer of the adhesive agent in this portion is approximately 1 - 50μm, and preferably, 2 - 30μm approximately.

[0061] Further, an adhesion strength between the base and the cover in the portion wherein the gas discharging path is formed is approximately 50 - 800gf/15mm, and preferably, 100 - 400gf/15mm approximately. This is because adhesion is insufficient and therefore may damage sealing if the adhesion strength is smaller than 50gf/15mm at an ordinary temperature, whereas if the adhesion strength exceeds 800gf/15mm at an ordinary temperature, the pressure of gas from within a container or packing bag fails to cause peeling off of the cover from the base, and therefore, to open through the gas discharging path, which may damage the container or packing bag.

[0062] In order to ensure that the cover which corresponds to the gas discharging path will be peeled off without fail, the adhesion strength between the base and the cover at the gas discharging path is desirably 5 - 80 % of an adhesion strength in other portion except for the gas discharging path.

[0063] It is recommended that the adhesion strength between the base and the cover except at the gas discharging path is 800 - 2,000gf/15mm at an ordinary temperature. With the adhesion strength in this range, the pressure of excessive gas will not peel off the cover other than at the gas discharging path.

[0064] A plurality of such gas discharging paths may be formed with respect to one gas discharging hole. In such a case, since the only requirement is to link inside

the package with outside the package through any one of the gas discharging paths, a reliability of discharging gas is enhanced. Further, it is needless to mention that more than one gas discharging holes may be formed instead of forming only one gas discharging hole.

[0065] As described above, like the packing material according to the first invention, the packing material according to the second invention is formed in the shape of a lid for a container, a bag, a tube or the like, and used for packaging beverage and/or food. In addition, a container or packing bag formed using this packing material is similarly convenient as a container or packing bag which is formed using the packing material according to the first invention.

[0066] As described above, with respect to the packing material according to the second invention, since the adhesion strength between the base and the cover corresponding to the gas discharging path is weaker than the adhesion strength in the other portion, when a container or packing bag is heated, the pressure of excessive gas generated from beverage and/or food quickly opens through the gas discharging path, although the other portion does not see peeling off of the cover from the base. This suppresses a possibility of the heated beverage and/or food boiling over extremely small. Further, this does not lead to a loud plosive sound associated with peeling off of the entire cover from the base.

[0067] The packing material according to the second invention is characterized in that the gas discharging path is opened through by the pressure of excessive gas discharged through the gas discharging hole of the base. For example, this is fundamentally different in principle from a technique (such as that described in Japanese Patent Application Laid-Open Gazette No. 8-151084) according to which a gas discharging path is clogged up with a melting material which melts at a high temperature and as the melting material melts away under heat during heating of a container or packing bag using a microwave oven, the gas discharging path is opened through. Further, the packing material according to the second invention is less expensive than to use such a melting material and is totally free from a risk of a melting material getting mixed within beverage and/or food.

[0068] In a preferred aspect of the packing material according to the second invention, there is a second gas discharging hole in the cover at a position not overlapping the gas discharging hole of the base.

[0069] The second gas discharging hole does not have to be always wide open, but may be merely a small cut in the cover, for instance. At least, the second gas discharging hole has to open when excessive gas, vapor or the like escapes at the gas discharging hole which is formed in the base. When the second gas discharging hole is to be formed, the gas discharging path is located at such a position which allows to link the gas discharging hole of the base with the second gas discharging hole.

[0070] That is, when beverage and/or food contained within a container or packing bag formed using the packing material according to the second invention is heated up with a microwave oven, the pressure of excessive gas generated by heating escapes through the gas discharging hole of the base and pressurizes the relatively weak adhesive layer between the base and the cover, whereby the cover in this portion falls off and accordingly open through the gas discharging path. At this stage, if there is no second gas discharging hole, unless the gas discharging path opens through from the gas discharging hole of the base to an edge of the packing material, the excessive gas can not be discharged outside the container or packing bag. If there is the second gas discharging hole formed in the cover, the gas discharging path has to be opened only between at least the gas discharging hole of the base and the second gas discharging hole. Considering such a function of the second gas discharging hole, it is desirable that the second gas discharging hole is located appropriately close to the gas discharging hole of the base (at a position in the range of 2 - 30 mm from the hole, and preferably, 5 - 10 mm from the hole).

[0071] The third invention is directed to a container for sealing beverage and/or food, using the packing material according to the first invention.

[0072] The container according to the third invention comprises a container main part in which beverage and/or food is filled and a lid formed by the packing material according to the first invention. The container main part is formed by a microwave-transmitting material which can be microwaved, and is a vessel-like molded item of a synthetic resin, a paper treated with a synthetic resin, glass, ceramic or the like. The lid is a molded item of the packing material according to the first invention, whose base is adhered to an opening of the container.

[0073] In a preferred aspect of the container according to the third invention, the lid comprises a tongue-like protrusion. The tongue-like protrusion is means for firmly holding the lid with fingers to open the lid. While an entire layer of the lid (integrated layer of the base and the cover which are adhered to each other) may be extended, the base is preferably extended to form the tongue-like protrusion. In other words, since the base portion of the lid is to be adhered to the container main part, it is possible to entirely open the lid member only if the base is peeled off from the container main part. Meanwhile, if the base is extended to form the tongue-like protrusion, the flexibility of the tongue-like protrusion is larger than where the entire layer of the lid is extended to form the tongue-like protrusion, thereby further guaranteeing another advantage that when an over cap is to fit with the lid such that the over cap covers the lid, for instance, the tongue-like protrusion naturally bends and receives the over cap smoothly.

[0074] In another preferred aspect of the container according to the third invention, there is the second gas discharging hole formed in the cover of the lid at a po-

sition not overlapping the gas discharging hole of the base. A function and an effect of the second gas discharging hole are as described earlier in relation to the packing material according to the first invention.

[0075] The position of the second gas discharging hole is preferably on the opposite side to the tongue-like protrusion. With respect to "the opposite side" as herein termed, assuming a central portion of the lid is the origin, and a straight line is drawn between the origin and the tongue-like protrusion while a vertical line is drawn normal to this straight line and the origin to thereby divide the lid into two regions by means of the vertical line, "the opposite side" means that the second gas discharging hole is located in one of the two regions in which the tongue-like protrusion is not formed. In this manner, if the second gas discharging hole is formed on the opposite side to the tongue-like protrusion, even if high-temperature vapor or the like blows out from the second gas discharging outlet, it is possible to firmly hold the tongue-like protrusion with bare hands.

[0076] In still other preferred aspect of the container according to the third invention, a reclosing prevention piece is formed at a peripheral edge of the gas discharging hole of the base.

[0077] When beverage and/or food is heated in the container according to the third invention, the base and the cover become separated from each other, vapor or other excessive gas blows out from within the container through the gas discharging hole, and therefore, destruction of the container is prevented. However, if the base and the cover tightly adhere to each other once again and consequently seal off the container after heating is stopped, as the beverage and/or food cools down, the pressure inside the container decreases and the container may therefore be deformed. The reclosing prevention piece serves as means for preventing the cover from tightly adhering to the base again in such a manner.

[0078] The reclosing prevention piece may be formed by notching cuts in a radial pattern at the peripheral edge of the gas discharging hole, or forming the gas discharging hole in the form of a star, a gear, a cross or the like, for example. When beverage and/or food is heated in the container which comprises such a reclosing prevention piece, although vapor or other excessive gas acts upon the cover from inside the container through the gas discharging hole and this pressure peels off the cover from the base, at this stage, the heated gas deforms the reclosing prevention piece which are disposed to the gas discharging hole and the reclosing prevention piece accordingly stands up. Hence, even if the cover tends to adhere to the base once again after heating ends, the reclosing prevention piece now standing prevents tight adhesion of the cover.

[0079] Alternatively, one or more than one reclosing prevention cuts may be formed other than at the gas discharging hole of the base, to thereby obtain a similar effect. The cuts are in such a shape which define a reclosing prevention piece when the cuts are opened, and which shape may be a radial shape, a cross shape, a Y-letter shape, a Z-letter shape, a U-, V-, a W-, an M-, an N-, an H-, a S-, an Ω-, a Σ- or a Y-shape, etc. With such cuts formed in the base, in a range where the cover is peeled off, excessive gas such as vapor blows out through these cuts as well and the cuts, deformed by heat, stand up. After heating, the cuts now standing prevent the cover from tightly adhering to the base again. The cuts may be used in combination with the precedent aspect according to which the reclosing prevention piece is formed at the peripheral edge of the gas discharging hole.

[0080] In yet another preferred aspect of the container according to the third invention, a microwave-shielding layer is formed in a side surface portion of the container main part The microwave-shielding layer is disposed in a range covering a portion in which a top surface of contained beverage and/or food contacts the container main part

[0081] The microwave-shielding layer is formed by a thin metallic foil, such as an aluminum foil, and disposed to a wall surface of the container main part by a method which requires to adhere the metallic foil to the wall surface of the container main part, a method which requires to form the container main part as a multi-layer part containing the metallic foil, a method which requires to fit a separate metallic cap to the container main part, or other appropriate method.

[0082] With the microwave-shielding layer disposed, when the container is set within a microwave oven and beverage and/or food is heated up, a quantity of a microwave falling upon a top surface of the beverage and/or food, which becomes the hottest, is reduced. As a result, it is possible to suppress sudden boiling of the beverage and/or food which is sealed up in the container, and hence, further reliably prevent an accident that the beverage and/or food boils over from the container during heating.

[0083] The fourth invention is directed to a container for sealing beverage and/or food, using the packing material according to the second invention. The container according to the fourth invention is similar in basic structure to the container according to the third invention, and comprises a container main part formed by a microwave-transmitting material and a lid which fits with an opening of the container main part from above.

[0084] The lid is formed by the packing material according to the second invention. Since the gas dischaging path opened through between the base and the cover discharges excessive gas from within the container main part, the base and the cover do not get separated from each other in other portion, and hence, a risk of causing heated beverage and/or food to boil over is small. A plosive sound associated with opening of the gas discharging path is small. Even when the lid is coated with the over cap, the over cap will not get blown away during heating.

[0085] Further, since the cover is adhered to the base other than at the gas discharging path, there is no risk that the contained beverage and/or food will leak out even while the container is transported with hands after heating. Hence, such a container according to the fourth invention is suitable where beverage and/or food is liquid-state food such as soup and the drinkable.

[0086] In a preferred aspect of the container according to the fourth invention, the gas discharging path of the lid is preferably formed from the gas discharging hole to a brim of the lid. In this case, excessive gas discharged through the gas discharging hole of the base travels through the gas discharging path and escapes to outside the container at the brim of the lid.

[0087] In other preferred aspect of the container according to the fourth invention, there is the second gas discharging hole formed in the cover of the lid at a position not overlapping the gas discharging hole of the base. A function and an effect of the second gas discharging hole are as described earlier in relation to the packing material according to the second invention.

[0088] In still other preferred aspect of the container according to the fourth invention, the base and the cover are adhered to each other at an adhesion strength in the range of 50 - 800gf/15mm, and preferably, 100 - 400gf/15mm at an ordinary temperature, to thereby define the gas discharging path of the lid. Further, the adhesion strength of the base and the cover at the gas discharging path is preferably in the range of 5 - 80 % of an adhesion strength in other portion. As the adhesion strength between the base and the cover at the gas discharging path is weaker than the adhesion strength in the other portion, the pressure gas which acts upon the cover through the gas discharging hole from within the container main part peels off the cover only at the gas discharging path while leaving the cover in the other portion adhering to the base.

[0089] A plurality of such gas discharging paths may be formed with respect to one gas discharging hole. In such a case, since inside the package and outside the package are linked to each other through any one of the gas discharging paths, it is possible to further reliably discharge excessive gas to outside the container. Moreover, it is needless to mention that more than one gas discharging holes may be formed instead of forming only one gas discharging hole.

[0090] In yet another preferred aspect of the container according to the fourth invention, a reclosing prevention piece is formed at a peripheral edge of the gas discharging hole. Still different preferred aspect is that there is a reclosing prevention cut formed in the base other than at the gas discharging hole. Specific structures and functions of these are as described earlier in relation to the container according to the third invention.

[0091] In even different preferred aspect of the container according to the fourth invention, a microwave-shielding layer is formed in a side surface portion of the container main part. A structure and a function of the microwave-shielding layer are as described earlier in relation to the container according to the third invention.

[0092] As described above, the container according to the third and the fourth inventions or a packing bag using the packing material according to the first or the second invention, when beverage and/or food sealed up in such a container or packing bag is to be microwaved, can be placed inside a microwave oven as it is and heated up without any pre-treatment. Hence, a container or packing bag as such is particularly excellent to be used as a container or packing bag which is sold by means of an automatic vending machine which provides beverage and/or food products, such as soup, curry, snacks, Japanese hotchpotch and noodles, which are to be heated up with a microwave oven.

Examples

[0093] Although the respective inventions of the present application will be described in more details specifically in relation to the following embodiment, the inventions are not limited to the embodiments below.

Example 1

[0094] Figs. 1 and 2 are a front surface view and a back surface view, respectively, of a lid of a container, which is an embodiment of the packing material according to the first invention. Figs. 3 and 4 are an X-X' cross sectional view and a Y-Y' cross sectional view, respectively, of Fig. 1. Fig. 5 is a cross sectional view of the container which is sealed with the lid.

[0095] The lid (B) formed by the packing material according to the first invention comprises a base (1) of polyethylene terephthalate (PET) having a thickness of 42μm and a cover (2) which is obtained by stacking a PET layer (2a) having a thickness of 12μm and a paper layer (2b) having a thickness of 90μm one atop the other, such that the base (1) and the cover (2) are adhered to each other using an adhesive agent which contains polyethylene and has an adhesive strength of 250gf/15mm at an ordinary temperature (20°C).

[0096] A tongue-like protrusion (4) is formed at one end of the lid (B), two gas discharging holes (5) are formed at an end which is approximately opposite to the tongue-like protrusion (4) (i.e., at the other end), and the gas discharging holes (5) are covered with and completely sealed up with the cover (2).

[0097] After filling in beverage and/or food, the lid (B) is adhered to a flange (7) of a container main part (A: See Fig. 5.) with an adhesive agent (6) which contains polypropylene at an adhesive strength of 1,000gf/15mm at an ordinary temperature (20°C).

[0098] To heat up beverage and/or food filled in the container (C: See Fig. 5.) in a microwave oven, the container (C) as it is microwaved without partially or entirely opening the lid (B). Although the beverage and/or food generates steam due to heat and the pressure inside

the container main part (A) increases, as the steam pushes up the cover (2) through the gas discharging holes (5), the cover (2) falls off around the gas discharging holes (5) and excessive gas is discharged outside to reduce the pressure inside the container (C), and therefore, it is possible to continuously heat with the lid (B) staying. Meanwhile, at the tongue-like protrusion (4) which is at the other end with respect to the gas discharging holes (5), the cover (2) remains adhered to the base (1).

[0099] After heating, the container (C) is taken out from the microwave oven and the tongue-like protrusion (4) is pulled with fingers in a peel-off direction, whereby the lid (B) is removed from the container main part (A). During removal, since the tongue-like protrusion (4) is at a position away from the gas discharging holes (5), the steam discharged through the gas discharging holes (5) does not heat up the tongue-like protrusion (4), and therefore, it is easy to remove the lid (B).

Example 2

[0100] Fig. 6 is an appearance view showing an embodiment of the packing material according to the first invention, while Fig. 7 is a partially enlarged cross sectional view along a Z-Z' line in Fig. 6.

[0101] A packing bag (D) formed by the packing material according to the first invention comprises a base (1) of polypropylene having a thickness of 30μm and a cover (2) which is obtained by stacking an aluminum foil (2a) having a thickness of 7μm and polypropylene (2b) having a thickness of 40μm one atop the other, such that the base (1) and the cover (2) are adhered to each other using an adhesive agent which contains polyethylene at an adhesive strength of 500gf/15mm at an ordinary temperature (20°C). Gas discharging holes (5) are formed in the base (1) at six positions, and the gas discharging holes (5) are covered with and completely sealed up with the cover (2).

[0102] The packing material is bent into the shape of a bag, bonding is executed at a horizontal seal portion (10) and a vertical seal portion (12), beverage and/or food which generates gas during preservation is filled in through an open horizontal seal portion (11), and bonding is executed at the horizontal seal portion (11) at last, whereby the packing bag (D) is created. The seal portions (10), (11) and (12) are bonded with an adhesive agent which contains polypropylene, at an adhesive strength of 2,000gf/15mm at an ordinary temperature (20°C).

[0103] As preservation is started in this condition, although the beverage and/or food generates excessive gas inside the packing bag (D) to increase the pressure, since the excessive gas pushes up the cover (2) through the gas discharging holes (5), the cover (2) falls off from the gas discharging holes (5) to the horizontal seal portions (10, 11) and the vertical seal portion (12), the excessive gas is discharged to outside the packing bag (D), and the pressure inside the packing bag (D) decreases, to thereby allow continuous preservation.

Example 3

[0104] Fig. 8 is a perspective appearance view showing an embodiment of the container according to the third invention, while Fig. 9 is a partially enlarged cross sectional view along a V-V' line in Fig. 8.

[0105] In Fig. 8, after beverage and/or food is filled in, a lid (B) is adhered to a flange (7) of a container main part (A) at an adhesive strength of 1,000gf/15mm at an ordinary temperature (20°C).

[0106] Like the packing material described by way of example in the embodiment 1, the lid (B) comprises a base (1) and a cover (2), and the base (1) and the cover (2) are adhered to each other using an adhesive agent which contains polyethylene at an adhesive strength of 250gf/15mm at an ordinary temperature (20°C).

[0107] While a tongue-like protrusion (4) for firm holding is formed at one end of the lid (B), the tongue-like protrusion (4) is an extension of the base (1). The lid (B) has a circular shape which is approximately the same as that of the flange (7) of the container main part (A).

[0108] In addition, at a position on approximately opposite side to the tongue-like protrusion (4) (i.e., at the other end), a gas discharging hole (5) is formed in the base (1), and further, a second gas discharging hole (8) is formed in the cover (2) at a position in the vicinity of the gas discharging hole (5).

[0109] As the container (C) with beverage and/or food filled in is heated in a microwave oven, the pressure inside the container (C) increases, excessive gas pushes up the cover (2) through the gas discharging hole (5), and the cover (2) is peeled off from the base (1). Upon arrival at the second gas discharging hole (8), the peeling off links inside the container (C) with outside the container (C) through the second gas discharging hole (8), whereby the excessive gas is discharged and the pressure inside the container (C) drops.

[0110] Since the tongue-like protrusion (4) is merely an extension of the base (1), the tongue-like protrusion (4) is soft and easily bent. Fig. 10 is a perspective appearance view showing a function of the tongue-like protrusion. In Fig. 10, although the container main part (A) is coated with an over cap (E) for protecting the lid (B), since the tongue-like protrusion (4) is soft, an operation of coating with the over cap (E) is easily carried out

Example 4

[0111] Fig. 11 is an appearance view of a packing bag, which is another embodiment of the packing material according to the first invention, and Fig. 12 is a partially enlarged cross sectional view along a W-W' line in Fig. 11.

[0112] In Fig. 11, the packing bag (F) is formed by a similar material to have a similar structure to the packing

bag (D) described in relation to the embodiment 2 above (See Fig. 6.). Further, in the packing bag (F), as shown in Fig. 12, gas discharging holes (5) are formed in the base (1), and the gas discharging holes (5) are covered with and completely sealed up with a cover (2).

[0113] Still further, in the cover (2) of the packing bag (F), second gas discharging holes (8) are formed in the vicinity of the gas discharging holes (5).

[0114] In such a packing bag (F), as excessive gas is generated within the packing bag (F) due to heating, fermentation or the like and the pressure increases, since the gas pushes up the cover (2) whose adhesion strength is weak through the gas discharging holes (5), the cover (2) gets peeled off around the gas discharging holes (5). Upon arrival at the second gas discharging holes (8), the peeling off links inside the packing bag (F) with outside the packing bag (F) and the pressure inside the packing bag (F) decreases, and hence, an undesirable phenomenon such as blowout of the packing bag (F) does not occur.

[0115] As described above, in the packing bag (F) according to the embodiment 4, it is not necessary to peel off the cover (2) up to bonded portions, such as horizontal seal portions (10, 11) and a vertical seal portion (12), and since it is possible to discharge the excessive gas only if the cover (2) is peeled off to the second gas discharging holes (8) which are formed in the vicinity of the gas discharging holes (5), an undesirable phenomenon such as blowout of the packing bag (F) is prevented more reliably.

Example 5

[0116] Figs. 13 and 14 are a front surface view and a back surface view, respectively, of a lid of a container, which is an embodiment of the packing material according to the second invention. Figs. 15 and 16 are partially enlarged cross sectional views along an X-X' line and Y-Y' line, respectively, in Fig. 13. Fig. 17 is a partial cross sectional view of the container which is sealed with the lid.

[0117] The lid (B) formed by the packing material according to the second invention comprises a base (1) of polyethylene terephthalate (PET) having a thickness of 42μm and a cover (2) which is obtained by stacking a PET layer (2a) having a thickness of 12μm and a paper layer (2b) having a thickness of 90μm one atop the other. A tongue-like protrusion (4) for firm holding is formed at one end of the base (1), two gas discharging holes (5) are formed at an end which is approximately opposite to the tongue-like protrusion (4) (i.e., at the other end), and the gas discharging holes (5) are covered with and completely sealed up with a cover (2). In addition, gas discharging paths (9) are formed in the lid (B) from the gas discharging holes (5) to a brim of the lid.

[0118] The base (1) and the cover (2) are adhered to each other except at the gas discharging paths (9) with an adhesive agent which contains polyethylene at an adhesive strength of 1,000gf/15mm at an ordinary temperature (20°C). In the portion with the gas discharging paths (9), the base (1) and the cover (2) are adhered to each other at an adhesive strength of 100gf/15mm which is 10 % of the adhesive strength between the base (1) and the cover (2) in the other portion.

[0119] The lid (B), after beverage and/or food is filled in, is adhered to a flange (7) of a container main part (A: See Fig. 17.) with an adhesive agent (6) which contains polypropylene at an adhesive strength of 1,500gf/15mm at an ordinary temperature (20°C).

[0120] To heat up beverage and/or food filled in the container (C: See Fig. 17.) in a microwave oven, the container (C) as it is is microwaved without partially or entirely opening the lid (B). Although the beverage and/or food generates steam due to heat and the pressure inside the container main part (A) increases, as the steam pushes up the cover (2) through the gas discharging holes (5) at the gas discharging paths (9) whose adhesion strength is weak, whereby the gas discharging paths (9) is opened through from the gas discharging holes (5) to the brim of the lid. Since this discharges the excessive gas to outside and decreases the pressure inside the container (C), even when heating is continued with the lid (B) unremoved, there is no danger that the container (C) will blow out. Meanwhile, at the tongue-like protrusion (4) which is at the other end with respect to the gas discharging holes (5), the cover (2) remains adhered to the base (1).

[0121] After heating, the container (C) is taken out from the microwave oven and the tongue-like protrusion (4) is pulled with fingers in a peel-off direction, whereby the lid (B) is removed from the container main part (A). During removal, since the tongue-like protrusion (4) is at a position away from the gas discharging holes (5), the steam discharged through the gas discharging holes (5) does not heat up the tongue-like protrusion (4), and therefore, it is easy to remove the lid (B).

[0122] As described above, in the container (C) shown by way of example in Fig. 17, since the cover (2) is peeled off only at the gas discharging paths (9) thereby linking inside the container (C) with outside the container (C), a possibility that the beverage and/or food will boil over during heating is small. Further, since a range in which the cover (2) is peeled off from the base (1) is narrow, peeling does not accompany a loud sound. Still further, since a range in which the cover (2) is peeled off from the base (1) is narrow, even when the lid (B) is coated with an over cap, the over cap will not get blown away during heating.

Example 6

[0123] Fig. 18 is an appearance view another embodiment of the packing material according to the second invention, and Fig. 19 is a partially enlarged cross sectional view along a Z-Z' line in Fig. 18.

[0124] A packing bag (D) formed by the packing ma-

terial according to the second invention comprises a base (1) of polypropylene having a thickness of 30μm and a cover (2) which is obtained by stacking an aluminum foil (2a) having a thickness of 7μm and polypropylene (2b) having a thickness of 40μm one atop the other. Gas discharging holes (5) are formed in the base (1) at six positions, and the gas discharging holes (5) are covered with and completely sealed up with the cover (2). Further, gas discharging paths (9) are formed from the gas discharging holes (5) of the base (1) to edge portions of the packing materials which are in the vicinity of the gas discharging holes (5).

[0125] The base (1) and the cover (2) are adhered to each other except at the gas discharging paths (9) with an adhesive agent (3) which contains polyethylene at an adhesive strength of 1,000gf/15mm at an ordinary temperature (20°C). In the portion with the gas discharging paths (9), the base (1) and the cover (2) are adhered to each other at an adhesive strength of 100gf/15mm which is 10 % of the adhesive strength between the base (1) and the cover (2) in the other portion.

[0126] The packing material is bent into the shape of a bag, bonding is executed at a horizontal seal portion (10) and a vertical seal portion (12), beverage and/or food which generates gas during preservation is filled in through an open horizontal seal portion (11), and bonding is executed at the horizontal seal portion (11) at last, whereby the packing bag (D) is created. The gas discharging paths (9) communicate with outside at the respective seal portions (10), (11) and (12). At the seal portions (10), (11) and (12), the base (1) is adhered to itself with an adhesive agent (6) which contains polypropylene at an adhesive strength of 1,500gf/15mm at an ordinary temperature (20°C).

[0127] With the packing bag (D) set within a microwave oven, when steam is generated within the packing bag (D) and the pressure increases as beverage and/or food inside is heated up, excessive gas pushes up the cover (2) through the gas discharging holes (5) at the gas discharging paths (9) whose adhesion strength is weak, whereby the gas discharging paths (9) are opened through. Since the excessive gas within the packing bag (D) traveling through the gas discharging paths (9) is discharged to outside the packing bag (D) through the gas discharging holes (5) and the pressure within the packing bag (D) decreases, even when heating is continued, an undesirable phenomenon such as blowout of the packing bag (D) does not occur.

Example 7

[0128] Fig. 20 is a perspective appearance view showing an embodiment of the container according to the fourth invention, and Fig. 21 is a partially enlarged cross sectional view along a V-V' line in Fig. 20.

[0129] In Fig. 20, the lid (B) is, after beverage and/or food is filled in, adhered to a flange (7) of a container main part (A) at an adhesive strength of 1,500gf/15mm at an ordinary temperature (20°C).

[0130] Like the packing material described by way of example in the embodiment 5, the lid (B) comprises a base (1) and a cover (2). While a tongue-like protrusion (4) for firm holding is formed at one end of the lid (B), the tongue-like protrusion (4) is an extension of the base (1). The base cover (2) has a circular shape which is approximately the same as that of the flange (7) of the container main part (A).

[0131] At a position on approximately opposite side to the tongue-like protrusion (4) (i.e., at the other end), a gas discharging hole (5) is formed in the base (1), and further, a second gas discharging hole (8) is formed in the cover (2) at a position in the vicinity. Further, a gas discharging path (9) is formed between the gas discharging hole (5) and the second gas discharging hole (8) of the gas discharging hole (5).

[0132] The base (1) and the cover (2) are adhered to each other except at the gas discharging path (9) with an adhesive agent which contains polyethylene at an adhesive strength of 1,000gf/15mm at an ordinary temperature (20°C). The gas discharging path (9) is adhered at an adhesive strength of 100gf/15mm.

[0133] As the container (C) with beverage and/or food filled in is placed in a microwave oven and heated, the pressure inside the container (C) increases, excessive gas pushes up the cover (2) through the gas discharging hole (5), and the cover (2) is peeled off from the base (1) at the gas discharging path (9) whose adhesion strength is weak Upon arrival at the second gas discharging holes (8), the peeling off links inside the container (C) with outside the container (C) through the second gas discharging holes (8), so that excessive gas is discharged and the pressure inside the container (C) drops.

[0134] As described above, when peeling off of the cover (2) from the base (1) occurs at the gas discharging path (9), since excessive gas is discharged only if the peeling off reaches the second gas discharging holes (8), it is possible to further reliably decrease the pressure inside the container (C).

[0135] In addition, since the tongue-like protrusion (4) is merely an extension of the base (1), the tongue-like protrusion (4) is softer than one which is an extension of an entire layer, and therefore, can be easily bent Hence, where the container main part (A) is coated with an over cap (not shown) for protecting the lid (B), the tongue-like protrusion (4) is easily bent, which allows to smoothly coat with the over cap.

Example 8

[0136] Fig. 22 is an appearance view of a packing bag, which is another embodiment of the packing material according to the second invention.

[0137] In Fig. 22, the packing bag (F) is formed by a similar material to have a similar structure to the packing bag (D) described in relation to the embodiment 6 (See

Figs. 18 and 19.). Further, in the packing bag (F), as in the embodiment 6 above, gas discharging holes (5) are formed in the base (1), and the gas discharging holes (5) are covered with and completely sealed up with a cover (2). As in the embodiment 6 described above, gas discharging paths (9) are formed in the packing bag (F).

[0138] In addition, in the cover (2) of the packing bag (F), second gas discharging holes (8) which are formed in the vicinity of the gas discharging holes (5), and the gas discharging paths (9) are formed from the gas discharging holes (5) to the second gas discharging holes (8).

[0139] In such a packing bag (F), when steam is generated within the packing bag (F) due to heat and the pressure increases, since the steam pushes up the cover (2) whose adhesion strength is weak through the gas discharging holes (5), the cover (2) is peeled off at the gas discharging paths (9) from around the gas discharging holes (5). Upon arrival at the second gas discharging holes (8), the peeling off links inside the packing bag (F) with outside the packing bag (F) and the pressure inside the packing bag (F) decreases, and hence, an undesirable phenomenon such as blowout of the packing bag (F) does not occur.

[0140] As described above, in the packing bag (F) according to the embodiment 8, it is not necessary to peel off the cover (2) up to bonded portions, such as horizontal seal portions (10, 11) and a vertical seal portion (12), and since it is possible to discharge excessive gas only if the cover (2) is peeled off to the second gas discharging holes (8) which are formed in the vicinity of the gas discharging holes (5), an undesirable phenomenon such as blowout of the packing bag (F) is prevented more reliably.

Example 9

[0141] Figs. 23 and 24 are back surface views of lids which are used for the container according to the fourth invention.

[0142] In the lid (B) shown in Fig. 23, four cuts (13a through 13d) are formed around a peripheral edge of a gas discharging hole (5) of a base (1). Meanwhile, in the lid (B) shown in Fig. 24, four cuts (13e through 13h) are formed around a peripheral edge of a gas discharging hole (5) so as to define an approximately cross shape as a whole. In either lid (B), these cuts form four reclosing prevention pieces (13) around the peripheral edge of the gas discharging hole (5).

[0143] Although the reclosing prevention pieces (13) are adhered to a cover (not shown) in a normal condition, when beverage and/or food in a container generates steam due to heat to thereby cause peeling off of the cover at a gas discharging path (9) and blowing out of the steam through the gas discharging hole (5), the four reclosing prevention pieces (13) are heated up, deformed due to the pressure of the blowing gas and kept standing. After heating, since the reclosing prevention pieces (13) prevent the cover from adhering to the base (1) once again, it is possible to prevent closing of the gas discharging hole (5), and hence, deformation of the container due to a reduction in the pressure within the container.

[0144] The reclosing prevention pieces (13) as such may be disposed to the lid of the container according to the third invention which is described by way of example in the embodiments 1 and 3.

Example 10

[0145] Fig. 25 is a back surface view showing another aspect of a lid which is used for the container according to the fourth invention.

[0146] In the lid (B) shown in Fig. 25, a plurality of x-letter like reclosing prevention cuts (14) are formed around a gas discharging hole (5) of a base (1).

[0147] Although these cuts (14) are normally coated with a cover, when beverage and/or food in a container generates excessive gas due to heat and the cover is peeled off at a gas discharging paths (9), steam blows out through the four reclosing prevention cuts (14) as well to heat up the cuts, so that the cuts are deformed by the pressure of the blowing gas and kept standing. After heating, since the reclosing prevention cuts (14) prevent the cover from adhering to the base (1) once again, it is possible to prevent closing of the gas discharging hole (5), and hence, deformation of the container due to a reduction in the pressure within the container.

[0148] While Fig. 25 shows that the cuts (14) are formed only in the range of the gas discharging paths (9), the cuts (14) maybe formed in the entire surface of the base (1). That is, whether there are the cuts (14) or not does not matter since the cover is not peeled off other than at the gas discharging paths (9). Forming the cuts (14) in the entire surface of the base (1) in advance is easier in terms of processing and demands less cost for production. In addition, where the cuts (14) are formed in the entire surface of the base (1), the lid may be used as the lid of the container according to the third invention which is described in the embodiments 1 and 4.

Example 11

[0149] Fig. 26 is a perspective appearance view showing still other embodiment of a lid which is used for the container according to the fourth invention, and Fig. 27 is a partially enlarged cross sectional view along a U-U' line in Fig. 26.

[0150] In Figs. 26 and 27, the lid (B) is formed by a similar material to have a similar structure to the lids (B) which are shown in Figs. 13 through 17.

[0151] A gas discharging hole (5) is formed approximately at a central portion of a base (1) of the lid (B), a cover (2) is adhered to an entire surface of the base (1).

A plurality of second gas discharging holes (8) are formed in the cover (2), and a gas discharging paths (9) is formed in a range linking the gas discharging hole (5) with the second gas discharging holes (8).

[0152] While the base (1) and the cover (2) are adhered to each other at an adhesive strength of 1,000gf/15mm at an ordinary temperature (20°C), adhesion is made at an adhesive strength of 100gf/15mm only in the range of the gas discharging path (9).

[0153] The lid (B) is adhered to a flange (7) of a container main part (A), in which beverage and/or food (L in Fig. 27) is filled, at an adhesive strength of 1,500gf/15mm at an ordinary temperature (20°C). A step (15) is formed in a lower portion of the flange (7) of the container main part (A).

[0154] Although the beverage and/or food generates steam and the pressure within a container (C) increases as the container (C) as it is is microwaved, since the pressure of excessive gas peels off the cover (2) at the gas discharging path (9) such that the gas discharging hole (5) is linked with the second gas discharging holes (8) to thereby discharge the excessive gas from inside the container (C) and decrease the pressure, an undesirable phenomenon such as blowout does not occur.

[0155] According particularly to this embodiment, since there are the plurality of second gas discharging holes (8) formed, it is possible to more reliably open through the gas discharging path (9).

[0156] In addition, while the step (15) is disposed to the container main part (A) in the container (C), an aluminum foil layer (16) which blocks a microwave is formed at the step (15). The aluminum foil layer (16) is disposed to cover a portion (L2) where a top surface (L1) of beverage and/or food (L) which is filled in the container main part

(A) contacts the container main part (A).

[0157] Although a general tendency is that a microwave is concentrated at the top surface of beverage and/or food during heating of the beverage and/or food in a container, with respect to this container (C), since the aluminum foil layer (16) is disposed covering the portion (L2) where the top surface (L1) of the beverage and/or food contacts the container main part (A), it is possible to reduce an amount of irradiation of a microwave upon the top surface (L1). This prevents excessive heating of the top surface (L1) of the beverage and/or food, and hence, sudden local boiling or boiling over of the beverage and/or food (L). While it is possible with this container (C), owing to the function of the gas discharging path (9) and the second gas discharging holes (8), to prevent boiling over of the beverage and/or food (L), the aluminum foil layer (16) further improves the prevention effect.

[0158] Moreover, in this container (C), a heat insulation layer (17) and a coating layer of polyester (18), which permit to safely hold the container main part (A) even when the beverage and/or food (L) is at a high temperature, are disposed outside the aluminum foil layer (16). With the container (C) held at the heat insulation layer (17), it is possible to safely transport the container (C) after heating.

[0159] The aluminum foil layer (16), the heat insulation layer (17) and the coating layer (18) of the container (C) according to the present embodiment are applicable to the container according to the third invention which is described in the embodiments 1 and 3. The boiling-over prevention ensured by the aluminum foil layer (16), in particular, is effective in the container according to the third invention wherein the cover is peeled off widely.

Industrial Availability

[0160] The packing materials described in the present application are usable as a lid for sealing off a container which is filled with beverage and/or food which is to be microwaved or otherwise appropriated heated for drinking and/or eating, and a packing bag which is formed in the shape of a bag, a tube or the like for packing of beverage and/or food.

[0161] The containers for sealing beverage and/or food described in the present application are containers for beverage and/or food which is to be microwaved or otherwise appropriated heated for drinking and/or eating. The containers do not require to be opened or pored a hole prior to heating, and therefore, a risk of heat-induced boiling over or the like is extremely small. Hence, the containers have a particularly excellent availability as containers for automatic vending machines which are equipped with heating means. Sale of beverage and/or food via such automatic vending machines can facilitate suppression of a labor cost, saving of energy, a reduction in a floor space of a store or other advantages, and hence, contribute to creation of a new sales channel for beverage and/or food.

Claims

1. A packing material comprising

   an unbreathable base containing a gas discharging hole; and
   an unbreathable cover which is adhered to one surface of said base so as to cover said gas discharging hole,
   wherein said cover is adhered to said base at such an adhesion strength which permits said cover to be peeled off when the pressure of excessive gas, which is generated from the beverage and/or food which is wrapped in said packing material, acts upon said cover through said gas discharging hole.

2. The packing material of claim 1, wherein the adhe-

sion strength between said base and said cover is 100 - 1,650gf/15mm.

3. The packing material of claim 1 or 2, wherein said cover comprises a second gas discharging hole, and said second gas discharging hole is formed at a position not overlapping said gas discharging hole of said base.

4. A packing material comprising:

an unbreathable base containing a gas discharging hole; and
an unbreathable cover which is adhered to one surface of said base so as to cover said gas discharging hole,
wherein a portion of said cover is adhered to said base at such an adhesion strength which permits said cover to be peeled off when the pressure of excessive gas, which is generated from the beverage and/or food which is wrapped in said packing material, acts upon said cover through said gas discharging hole, and a peeled portion of said cover forms a gas discharging path which links said gas discharging hole with outside said packing material.

5. The packing material of claim 4, wherein said gas discharging path is formed as said base and said cover are adhered to each other at an adhesion strength of 50 - 800gf/15mm.

6. The packing material of claim 4 or 5, wherein said gas discharging path is formed as said base and said cover are adhered to each other at an adhesion strength which is 5 - 80 % of an adhesion strength other than at said gas discharging path.

7. The packing material of any one of claims 4 through 6, wherein said cover comprises a second gas discharging hole at a position not overlapping said gas discharging hole of said base, and said gas discharging path is formed between said gas discharging hole and said second gas discharging hole.

8. A container for sealing beverage and/or food, comprising:

a container main part which transmits a microwave; and
a lid which seals off said container main part,
wherein said lid comprises an unbreathable base containing a gas discharging hole and an unbreathable cover which is adhered to a top surface of said base so as to cover said gas discharging hole, and said cover is adhered to said base at such an adhesion strength which permits said cover to be peeled off when the pressure of excessive gas, which is generated from the beverage and/or food which is wrapped in said packing material, acts upon said cover through said gas discharging hole.

9. The container of claim 8, wherein the adhesion strength between said base and said cover is 100 - 1,650gf/15mm.

10. The container of claim 8 or 9, wherein said cover comprises a second gas discharging hole, and said second gas discharging hole is formed at a position not overlapping said gas discharging hole of said base.

11. The container of any one of claims 8 through 10, wherein said lid comprises a tongue-like protrusion.

12. The container of claim 11, wherein said tongue-like protrusion is formed by extending said base.

13. The container of any one of claims 10 through 12, wherein said second gas discharging hole is formed at a position opposite to said tongue-like protrusion.

14. The container of any one of claims 8 through 13, wherein said gas discharging hole of said base comprises a reclosing prevention piece at a peripheral edge of said hole.

15. The container of any one of claims 8 through 14, wherein said base comprises one or more than one reclosing prevention cuts other than at said gas discharging hole.

16. The container of any one of claims 8 through 15, wherein said container main part comprises a microwave shielding layer in a side surface portion, and said microwave shielding layer is disposed so as to cover a portion in which a top surface of the sealed beverage and/or food contacts said container main part.

17. A container for sealing beverage and/or food, comprising:

a container main part which transmits a micriowave; and
a lid which seals off said container main part,
wherein said lid comprises an unbreathable base containing a gas discharging hole and an unbreathable cover which is adhered to a top surface of said base so as to cover said gas discharging hole, a portion of said cover is adhered to said base at such an adhesion strength which permits said cover to be peeled off when the pressure of excessive gas, which is generated from the beverage and/or food

which is wrapped in said packing material, acts upon said cover through said gas discharging hole, and a peeled portion of said cover forms a gas discharging path which links said gas discharging hole with outside said lid.

18. The container of claim 17, wherein said gas discharging path is formed from said gas discharging hole to a brim of said lid.

19. The container of claim 17, wherein said cover comprises a second gas discharging hole at a position not overlapping said gas discharging hole of said base, and said gas discharging path is formed between said gas discharging hole and said second gas discharging hole.

20. The container of any one of claims 17 through 19, wherein said gas discharging path is formed as said base and said cover are adhered to each other at an adhesion strength of 50 - 800gf/15mm.

21. The container of any one of claims 17 through 20, wherein said gas discharging path is formed as said base and said cover are adhered to each other at an adhesion strength which is 5 - 80 % of an adhesion strength other than at said gas discharging path.

22. The container of any one of claims 17 through 21, wherein said lid comprises a tongue-like protrusion.

23. The container of claim 22, wherein said tongue-like protrusion is formed by extending said base.

24. , The container of any one of claim 22 or 23, wherein said tongue-like protrusion is formed at a position opposite to a rear end of said gas discharging path.

25. The container of any one of claims 17 through 24, wherein said gas discharging hole of said base comprises a reclosing pmvention piece at a peripheral edge of said hole.

26. The container of any one of claims 17 through 25, wherein said base comprises one or more than one reclosing prevention cuts other than at said gas discharging hole.

27. The container of any one of claims 17 through 26, wherein said container main part comprises a microwave shielding layer in a side surface portion, and said microwave shielding layer is disposed so as to cover a portion in which a top surface of the sealed beverage and/or food contacts said container main part.

Fig. 1

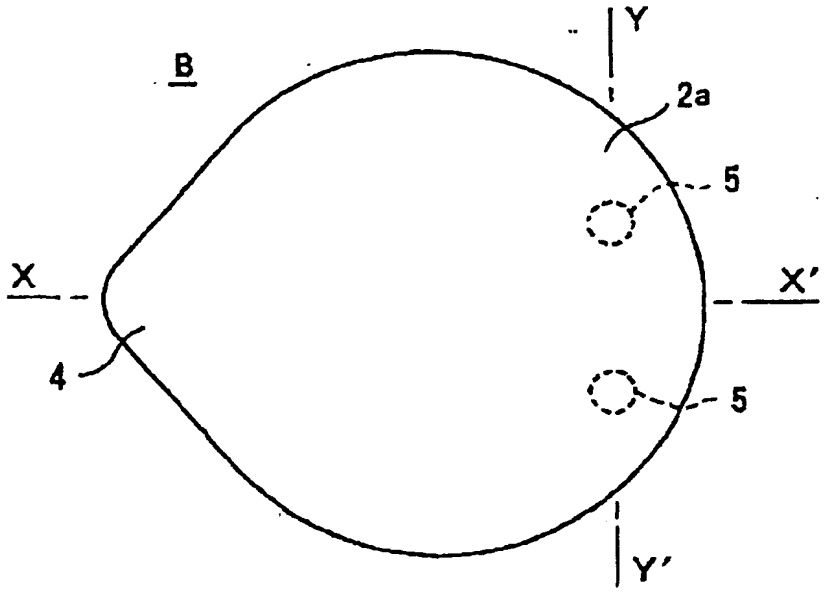


Fig. 2

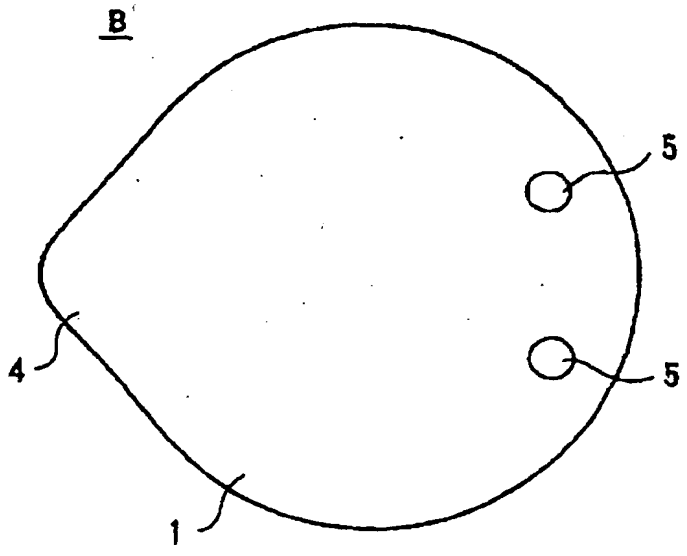


Fig. 3

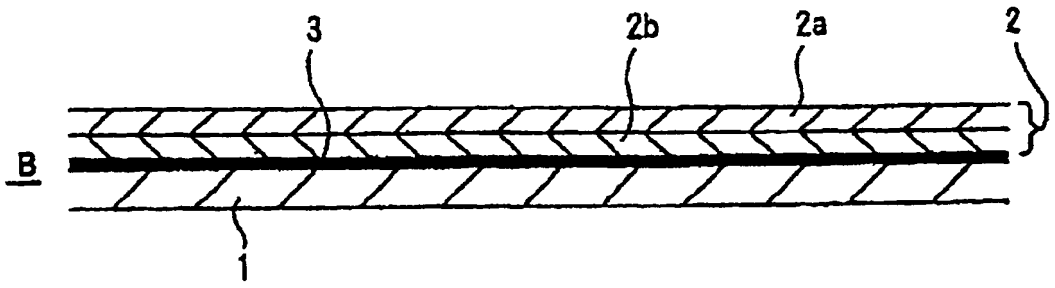


Fig. 4

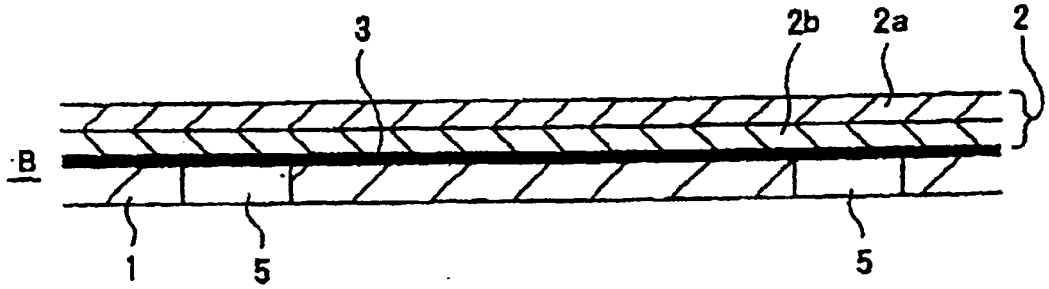


Fig. 5

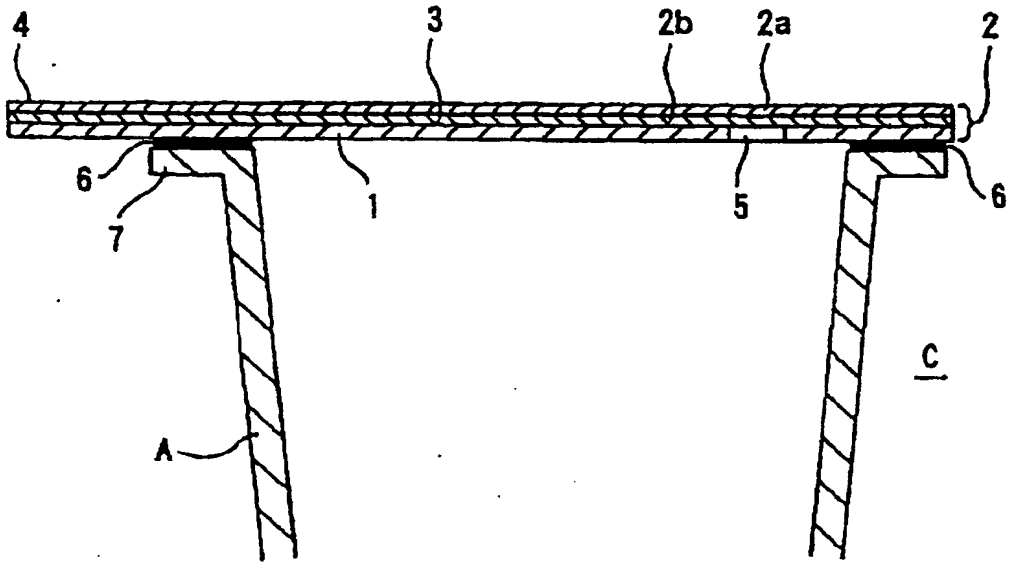


Fig. 6

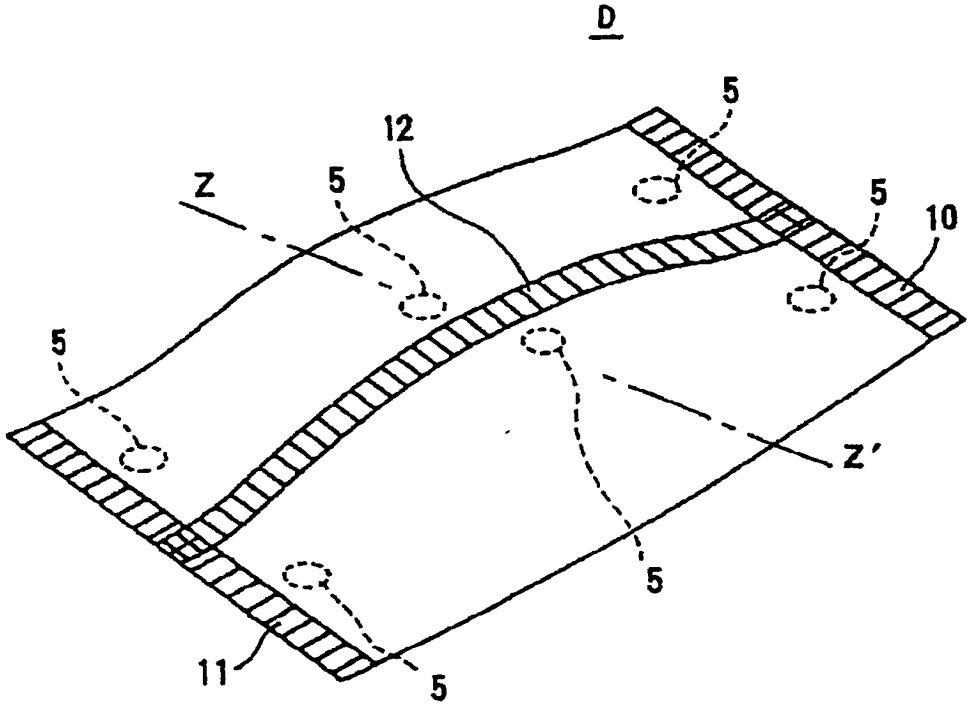


Fig. 7

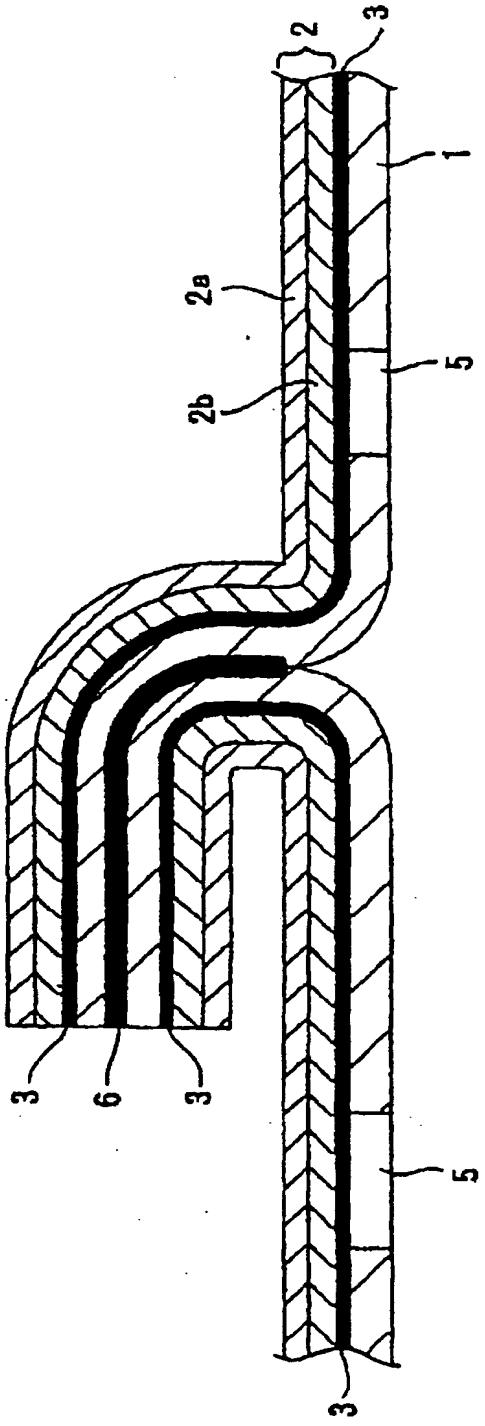


Fig. 8

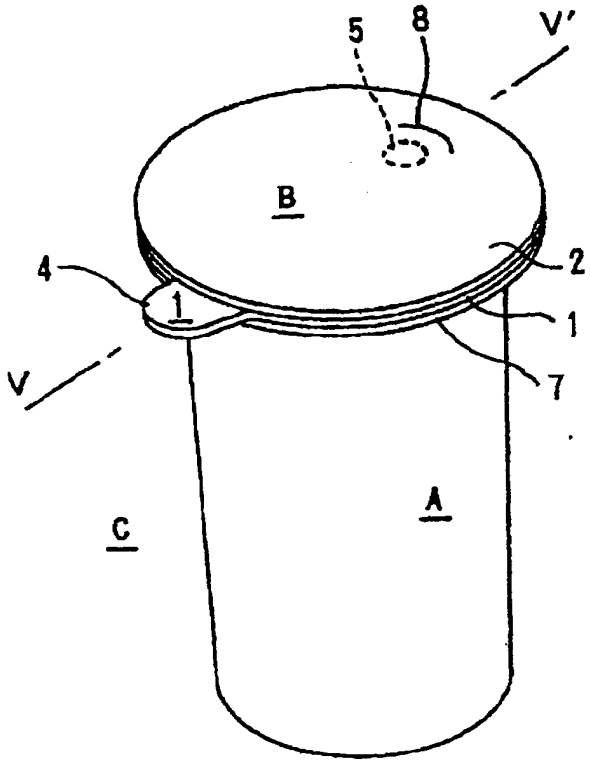


Fig. 9

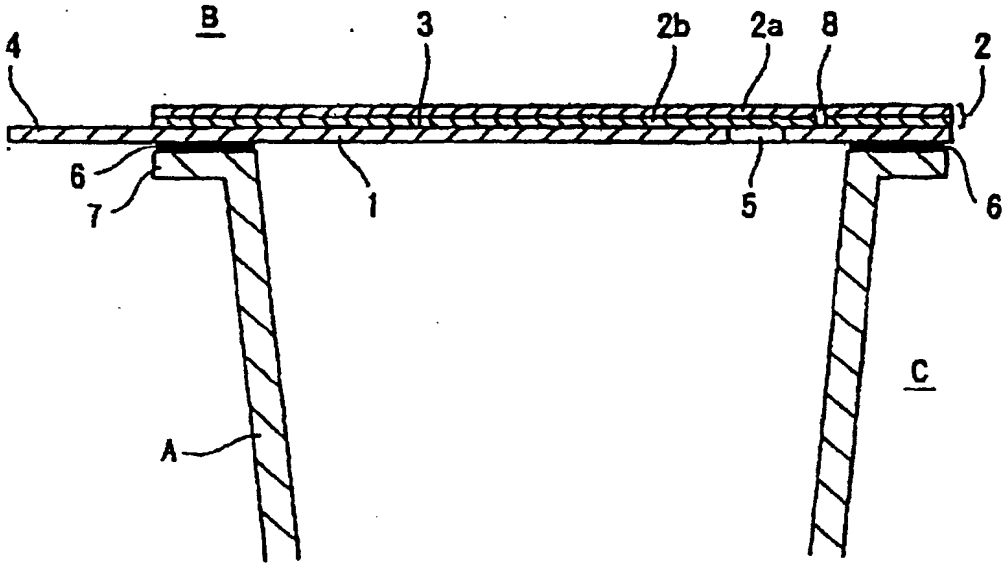


Fig. 10

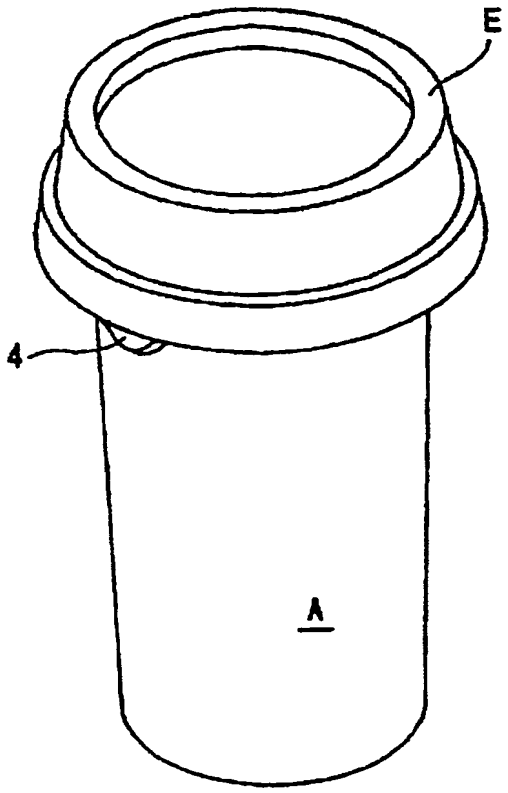


Fig. 11

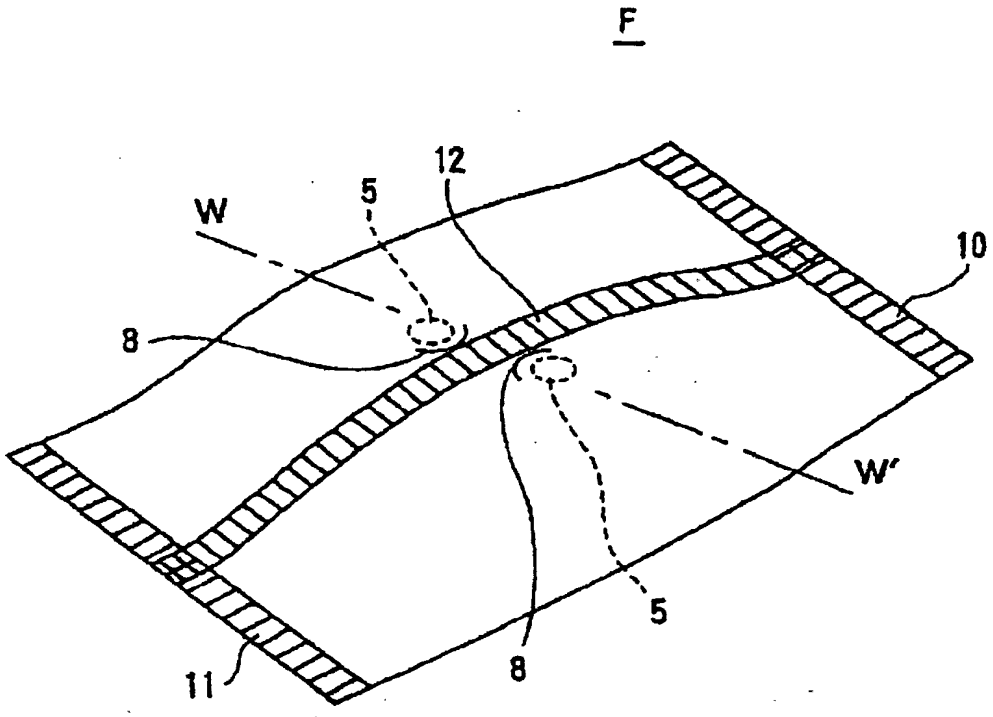


Fig. 12

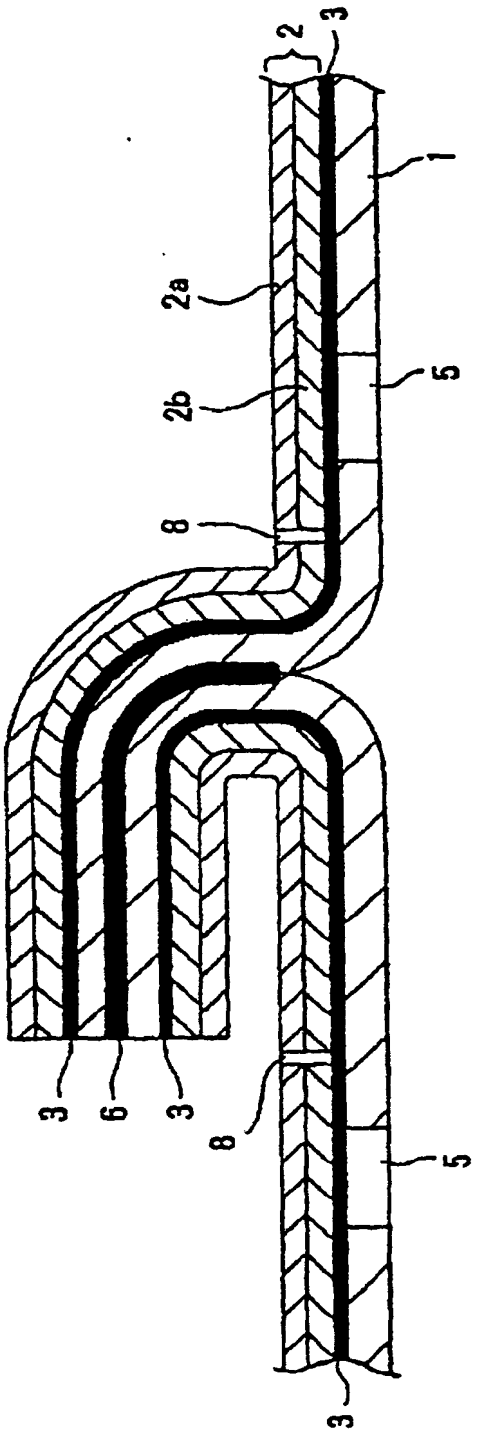


Fig. 13

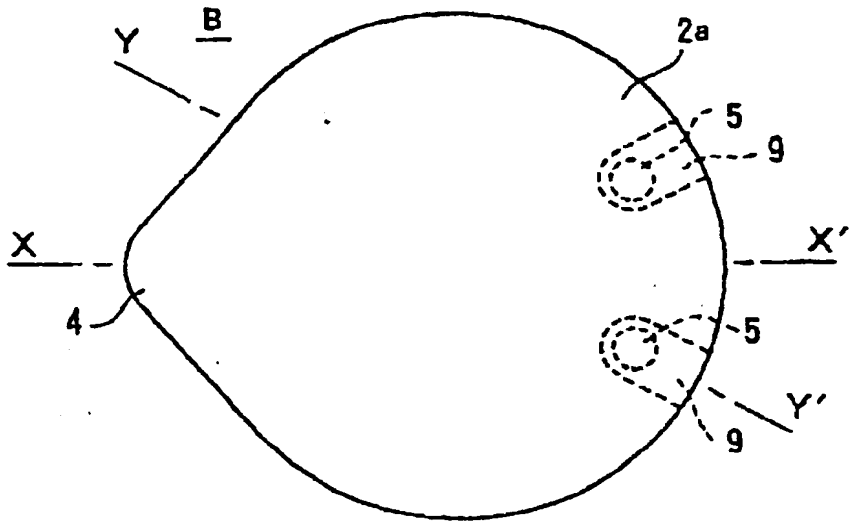


Fig. 14

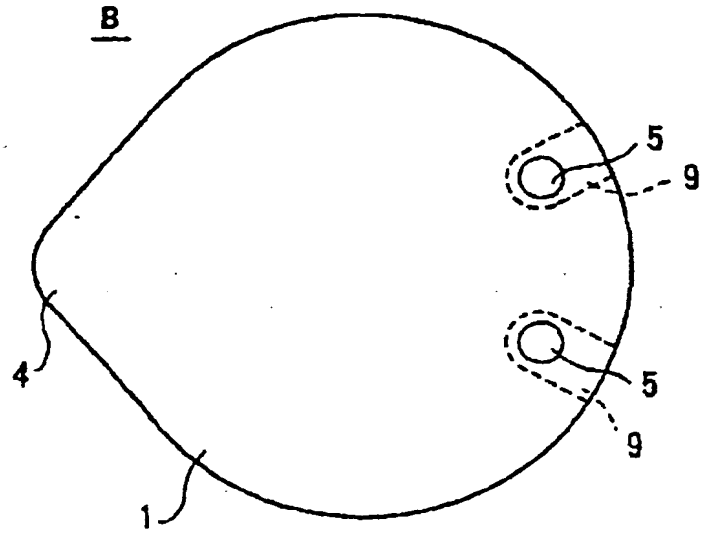


Fig. 15

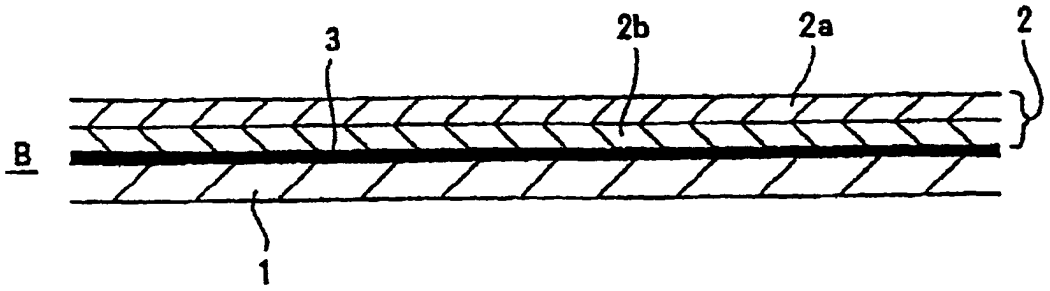


Fig. 16

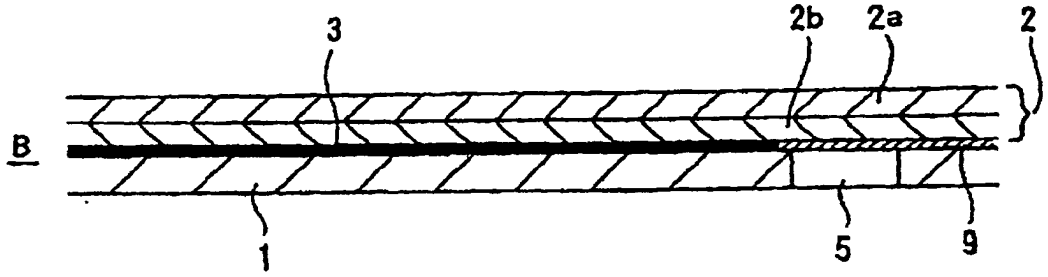


Fig. 17

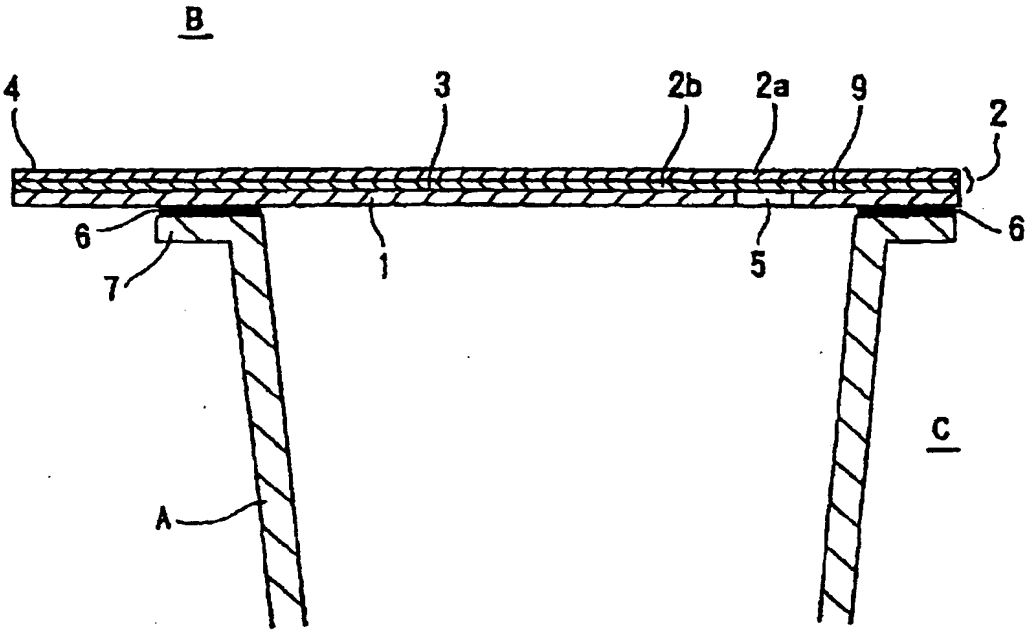


Fig. 18

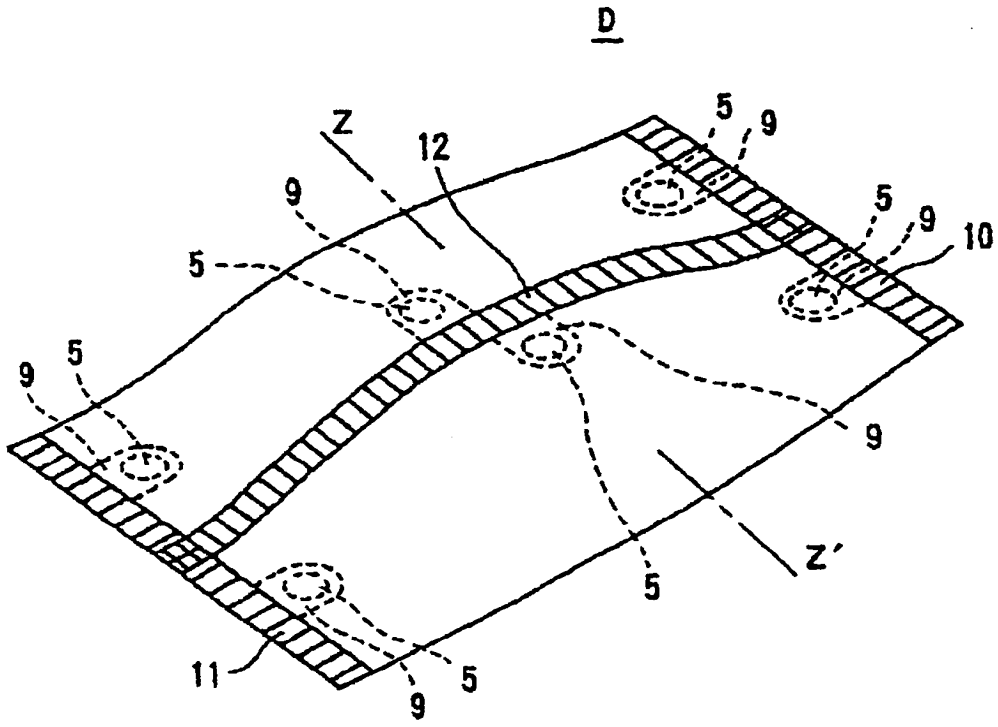


Fig. 19

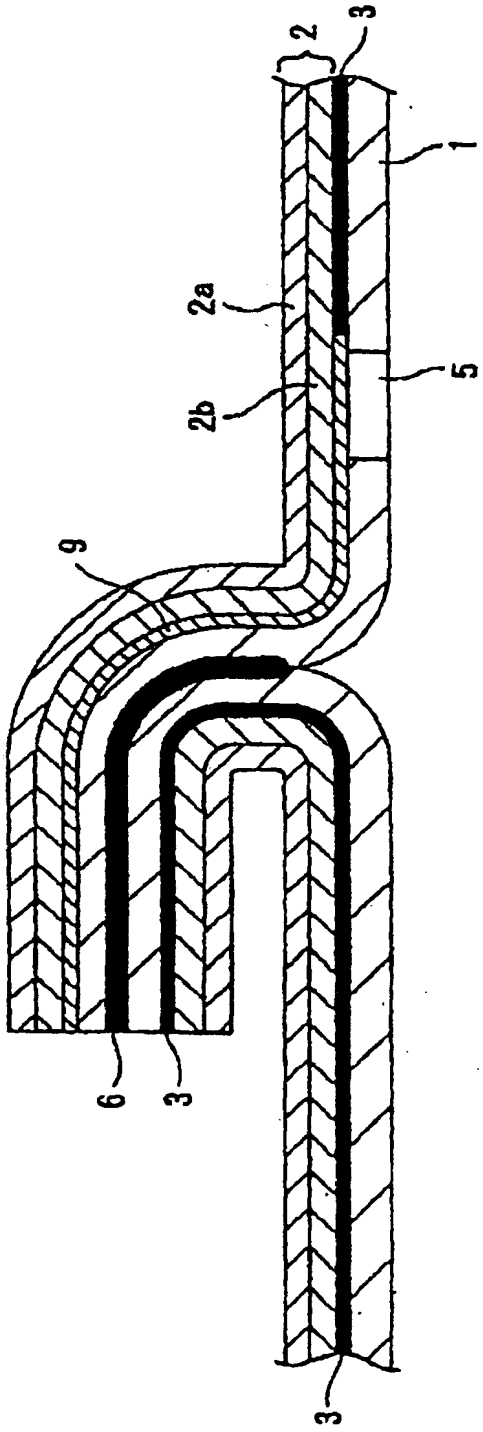


Fig. 20

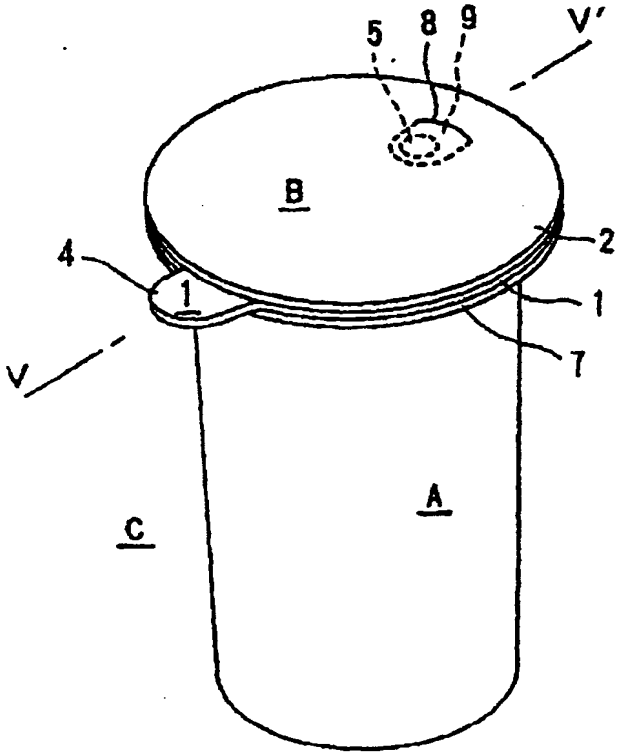


Fig. 21

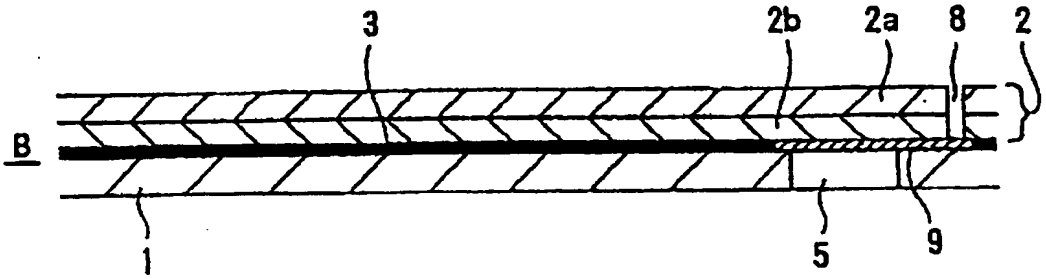


Fig. 22

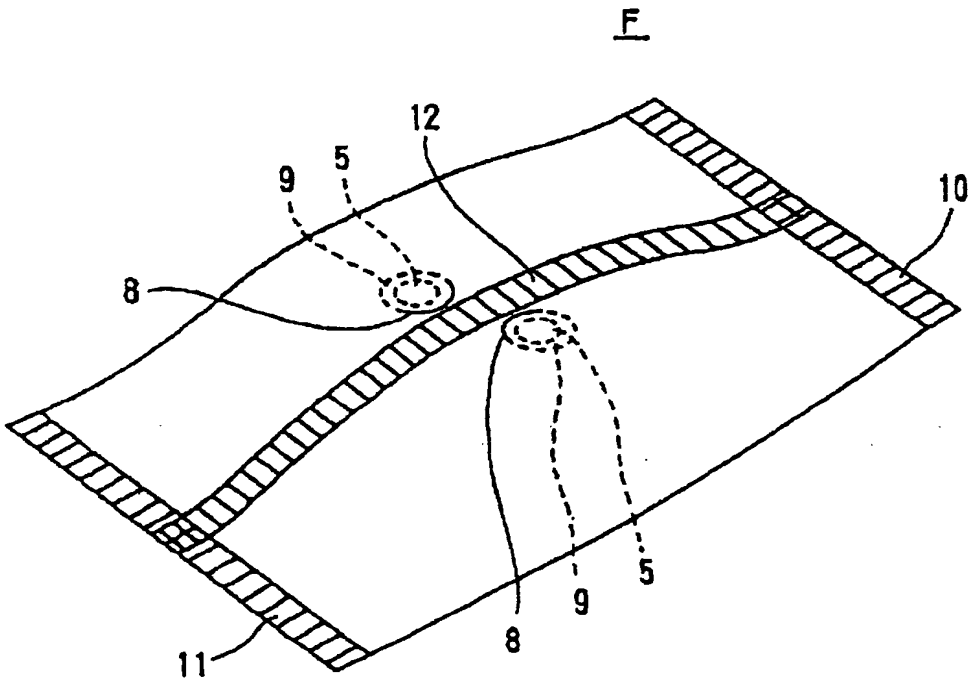


Fig. 23

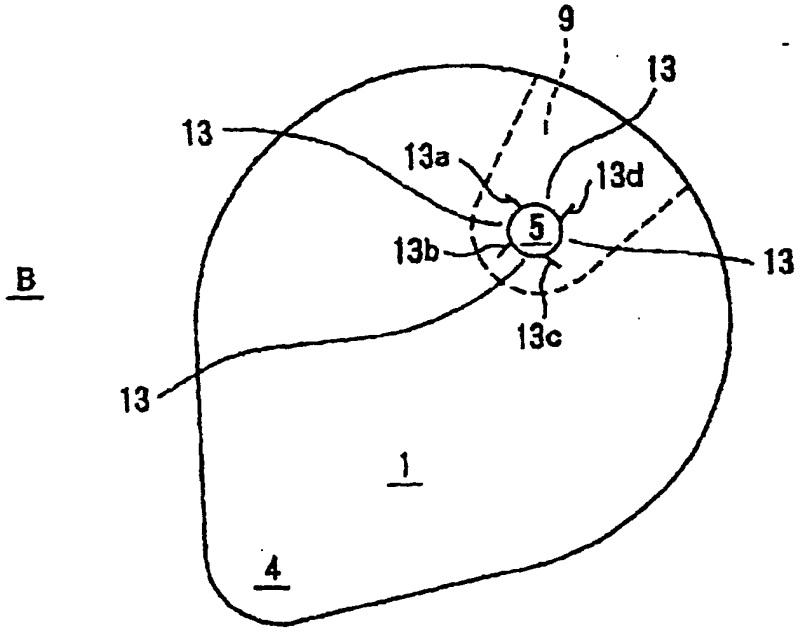


Fig. 24

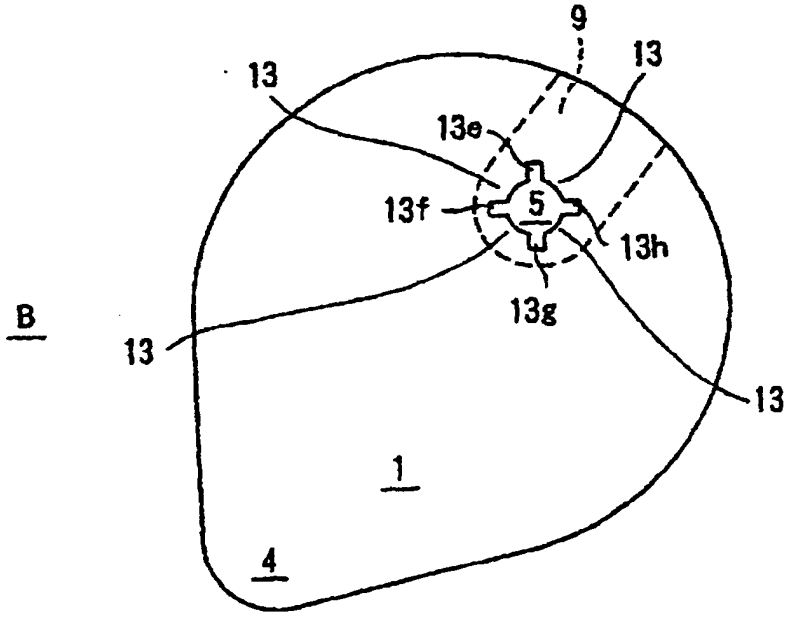


Fig. 25

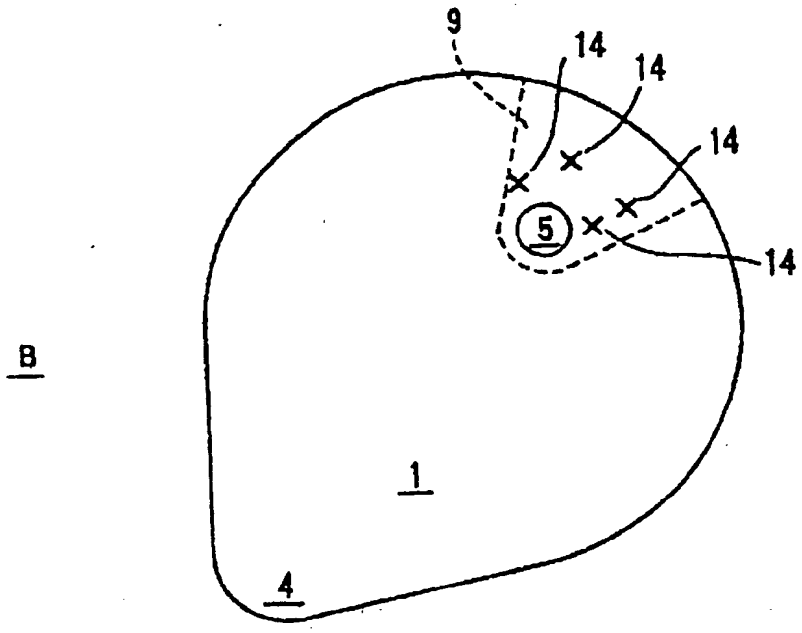


Fig. 26

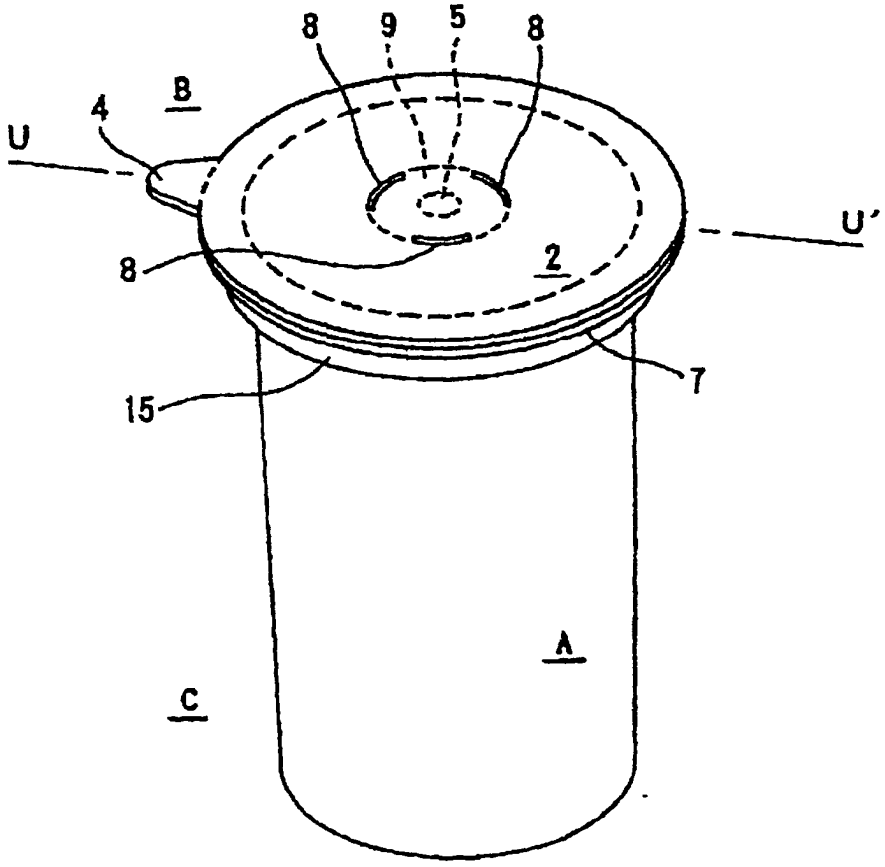
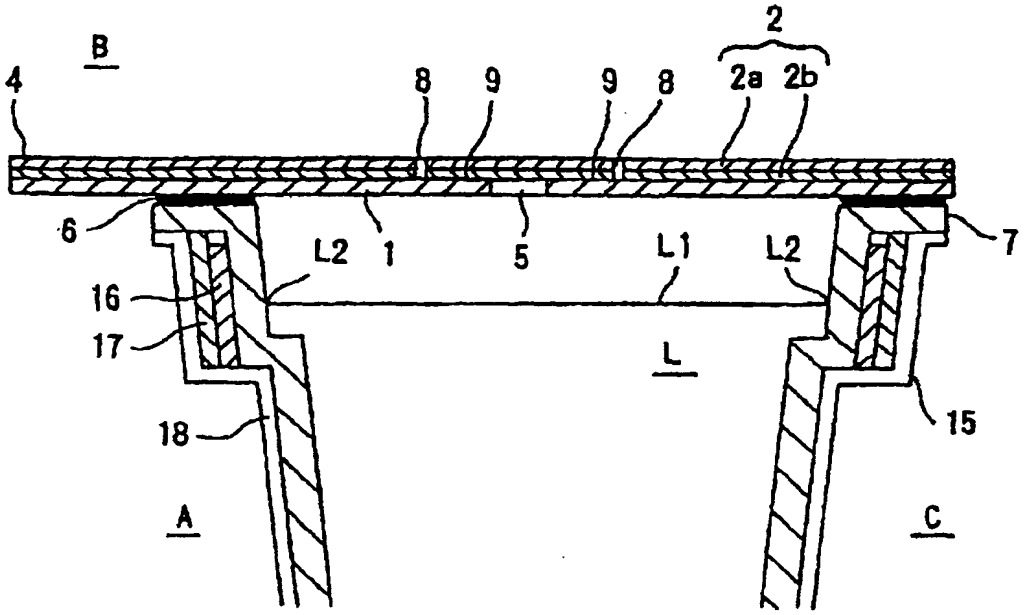


Fig. 27



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP99/02768

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[6] B65D81/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[6] B65D81/34, 33/01, 51/16, A23L3/00, F16K24/00-04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1925-1999
Kokai Jitsuyo Shinan Koho 1971-1999

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP, 1-98466, A (Hikari Kinzoku Kogyo K.K.), 17 April, 1989 (17. 04. 89), Page 2, lower left column, lines 18 to 20 (Family: none)	1
Y	JP, 2-180219, A (Kyoko Mizoguchi), 13 July, 1990 (13. 07. 90), Page 1, lower left column, lines 5 to 18 (Family: none)	1, 3
Y	JP, 3-148473, A (Toppan Printing Co., Ltd.), 25 June, 1991 (25. 03. 91), Page 1, lower left column, lines 3 to 12 (Family: none)	2
A	JP, 61-110558, U (Dainippon Printing Co., Ltd.), 12 July, 1986 (12. 07. 86), Page 2, lower left column, lines 5 to 13 (Family: none)	1, 3

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 August, 1999 (23. 08. 99)	31 August, 1999 (31. 08. 99)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP99/02768

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP, 8-33667, A (Dia Nori Kogyo K.K.), 6 February, 1996 (06. 02. 96), Page 1, lower left column, lines 3 to 19 (Family: none)	1, 3
Y	JP, 4-18273, A (Toyo Aluminium K.K.), 22 January, 1992 (22. 01. 92), Page 1, lower left column, lines 5 to 10 (Family: none)	4-7
A		8, 17-18

Form PCT/ISA/210 (continuation of second sheet) (July 1992)